

THE IRON AGE -- November 17, 1932

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CONTENTS

Still Waiting?—What For?	753
Sales "Shoe Leather," Past and Present	754
Controlling Operation of Steckel Mills	756
Automatic Production of Roller Chain	758
Monorail System in Warehouse	761
"Better Times"	762
Study of Production Methods	764
Putting the Question Mark to Work	769
Business in Its Larger Aspects	771



New Equipment	766
News	770
Automotive Industry	773
Personals and Obituaries	774
Letters to the Editor	776
Editorials	777
Markets	779
Construction and Equipment Buying	794



Products Advertised	(Advertising Section)	50
Index to Advertisers	(Advertising Section)	68



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CAPTAIN Elmer Walling, who pilots our lighter between our Phillipsdale, R. I., and New York Mills, weighed anchor one March afternoon for the trip to New York. During the night a March rain turned to a blizzard, with the wind blowing sixty miles an hour.

Captain Elmer should have put in at New London and waited for clearer weather. Instead, he headed the lighter into the gale with a million pounds of steel aboard. All night he fought his way along Long Island Sound. At times the wind and waves actually stood the boat on end. At 4 p. m. the next afternoon, the *Walling* tied up at our pier in the Harlem River, only three hours late.

When we asked the Captain why he pushed through the storm he answered, "I knew you needed the stuff." That's service that gold cannot buy.

Working with us for many years, the Captain, like all the rest of us, has come to recognize service to the customer as the first duty.

Perhaps you are pretty much like this yourself . . . ready to go through fire and water to please a customer. You understand, then, the type of service which we try to give to every customer who buys in small or large quantities.

We would like to co-operate with you the next time you require any of our products. In the meantime, we will be pleased to answer any inquiry which you may have.

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THE IRON AGE

NEW YORK, NOVEMBER 17, 1932

ESTABLISHED 1855

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Still Waiting?—If So, for What?

THE floods of political oratory cease, "the shouting and the tumult die." Now in the ensuing welcome silence, practical Americans can better plan their course of business action.

What shall it be, watchful waiting or persistent plugging?

We have had too much watchful waiting during the bygone months. "Let's wait until Congress adjourns; let's wait until the conventions are over; let's wait until election takes place."

Watchful waiting may at times be meritorious, but its continued practice gets one nowhere. Our practice of it has inoculated some of us with the "mañana" virus. And this "tomorrow" habit saps the vitality of those who indulge in it.

There are those of us who planned renewed sales effort had the election gone the other way. We may be tempted to wait a while longer to see what happens. How much longer? The political die has been cast for four years. Better start if you expect to get going at all.

Business takes both its politics and its politicians too seriously. Men did business and made profits long before the first Democrat or Republican cast his ballot. Men will continue to do business profitably long after these party labels are mildewed and moth-eaten.

Have no fear of a "radical" administration. The party in power always becomes conservative. Witness the erstwhile Labor government of Great Britain.

Have no fear of the abandonment of protective tariffs and the ensuing dumping of foreign goods and ditching of American wage levels. Economic pressure, not of political parties, dictates tariff acts. Witness "free trade" England.

Have no fear of a discontinuance of established reconstruction and rehabilitation policies. No doctor will change the medicine of an improving patient for whose recovery he is responsible.

The present attitude of our business men will do more to determine the fate of American business than the problematical actions of administrative and legislative bodies. If we extend the period of watchful waiting, business will *not* get better and political experimentation will be in order. If we throw off the mañana virus and put our shoulders to our individual wheels—now—business will continue to improve and we shall insure the perpetuation of sound governmental policies.



Sales "Shoe Leather," Past and Present

By H. A. RUSSELL

Purchasing Agent, A. B. Farquhar Co., Ltd.

EVEN with the decline in business volume, there does not seem to exist the usual tendency for falling off in the number of salesmen calling at this office. It is true that during the past two years our manufactured lines to some extent have changed, but we are buying practically the same materials and supplies as heretofore. A few items have been dropped, while a few others have been added.

In the past, we have noted that when business conditions were fair there was a tendency for the number of salesmen's calls to increase. When conditions were better than fair, there would be a decline in the number of salesmen calling. This was accounted for by the tendency to send more orders through the mail rather than to wait for the salesmen to call, and which would result in some of the salesmen being held at the plant or office to help out with other work. When business conditions were poor or bad, there was also a tendency for the number of calls to decline. However, that is not the condition now, at least so far as this office is concerned, and the number of salesmen making calls here during the first four months of this year was higher than the average for the corresponding period of the past six years.

We started in 1926 keeping a record of salesmen's calls, classified as to cer-

tain products and lines, and by months. The totals for the various years are as follows:

1926	2499
1927	2782
1928	3042
1929	2881
1930	2674
1931	2692

Or a total of 16,570 calls in six years. If we divide this total by the 72 months, in these six years, we find that there was an average of 230 calls per month.

The record for this year indicates the number of calls for the first four months was as follows:

January	263
February	272
March	251
April	275

Or a monthly average of 265. By referring to our records for the corresponding four months, for the six previous years, we find the following averages:

1926	219
1927	232
1928	273
1929	240
1930	247
1931	230

With the exception of 1928, this year (1932) started out with a higher average, even though the salesmen were sending in fewer orders, or that is the impression I received from those who talked frankly to me.

A short time ago a salesman called at this office, who started off as follows: "Hello, Mr. Russell. I am selling the worst belt on earth. I have been in Allentown, Reading, Harrisburg, Lancaster and York, and have not sold five cents' worth. Do you want any?" He then explained that he had been trying to sell his belt as good belt, the equal of any other good belting, but finding that was not successful, he had changed his tactics.

Complete Record for 13 Weeks

We do not have daily records of calls previous to the first of the present year, as all of the forms on which we accumulated the total of the monthly calls were destroyed and the totals by months retained. However, we do have the records of daily calls from the beginning of this year, but in the following tabulation, I am dropping the month of January, not because this month was any different from February, March and April, as the total calls for January were 263, but because Feb. 1 was on a Monday, and April 30 on a Saturday, in other words, completing the 13 weeks. I give the daily record of salesmen's

calls below for the above period; namely, Feb. 1 to April 30, 1932, inclusive:

Monday	Tuesday	Wednesday	Thursday	Friday
6	10	15	17	16
6	24	24	22	19
14	24	9	15	7
5	8	5	22	9
7	8	11	17	10
7	8	11	10	6
11	20	10	14	12
6	14	17	8	8
7	12	14	9	14
7	16	15	13	14
8	16	9	16	14
9	18	9	16	12
9	10	14	11	12
102	188	163	190	153

We have very few salesmen callers on Saturday mornings, only by appointment. The great majority of out-of-town salesmen leave for their homes on Friday evening, and the local salesmen are usually busy in the stores and offices of the firms they represent.

So far we have considered only the first four months of 1932. For the months of May, June, July and August, the following table will show a comparison of salesmen's calls with the same months in the years 1926-1931:

	May	June	July	August
1926	230	200	211	203
1927	212	267	194	245
1928	312	260	220	212
1929	256	259	259	248
1930	250	247	192	172
1931	219	245	231	166
1932	202	216	186	215

The averages for these four months, in each of the seven years listed, are as follows:

1926	211
1927	229
1928	251
1929	256
1930	215
1931	215
1932	205

The total number of calls for this year so far, that is up to Sept. 1, is

SALES effort, represented in part by salesmen's calls, has been curtailed by a considerable number of metal-working and machinery-building concerns. Is this a sound present-day policy? Perhaps it might be condoned as an economy measure, provided one's competitors were all doing likewise.

The author, purchasing executive of an important and typical company, has maintained detailed records of the sales calls made upon his company for the past six years. His statistics show that the average number of calls has been surprisingly well maintained during the depression, and that up to Sept. 1 of this year, the total exceeded those for the corresponding period in 1931.

This article is the fifth in THE IRON AGE'S series on the important general subject of Modern Merchandising and Marketing in the Metal-Working Industry.



1880 and this compares with 1780 in 1931.

A salesman today is of vital importance to his firm, because of the fu-

ture benefits to be derived from his regular contact with customers or prospective customers. Now is the time to start the ground work for future sales. There are very few firms today that are not working under some kind of a handicap, or collection of handicaps, and helpful service now means more than under normal, or closer to normal, conditions.

Every order seems to require extra quick service. Stocks are low or mismatched. Quotations are made on customers' inquiries in a rush. The placing of the actual order may be delayed weeks and months, but when finally placed is a rush order. All along the line special service is asked, and usually secured. It is a procedure that has a tendency to increase costs, and requires extra precaution to avoid errors. Specifications are more technical than in the past, and the buyer more frequently calls on the salesman or his firm for additional specific details, greater information as to the adaptability of the product to the needs of the ultimate user.

The cost of selling today is undoubtedly excessive in many lines, but some of this extra expense can be looked upon as holding the good will of the customer and retaining him as a customer.

I know that there are many salesmen who formerly called, that have not been in this office during the past few months. A large proportion of those calling seem to be new men on this territory. Others are dropping in more frequently than in previous years. I believe that more calls are made in each city and town because even small orders are welcomed today, not only by the salesman but by the firm he represents. And once a customer has been secured, even if the initial order is only a small one, there is a much better future opportunity for the salesman when larger orders are in the offing.

Advocate Coarse Grain Steel For Gear Forgings

STEEL of a coarse grain upsets into a denser product than one of finer grain and the denser material is more readily machined, according to F. W. Cederleaf, works manager of the Muncie Products Division of the General Motors Corp., Muncie, Ind., and W. E. Sanders, plant and metallurgical engineer at the Muncie plant. Their studies of forgings, having gear forgings particularly in mind, were contributed to the American Society of Mechanical Engineers.

They find that a forging temperature of 2150 deg. F. must be maintained within a variation of not more than 100 deg. They insist that the dies must be designed so that the flash interferes to a minimum extent with the compressing of the metal in the subsequent operations. After cor-

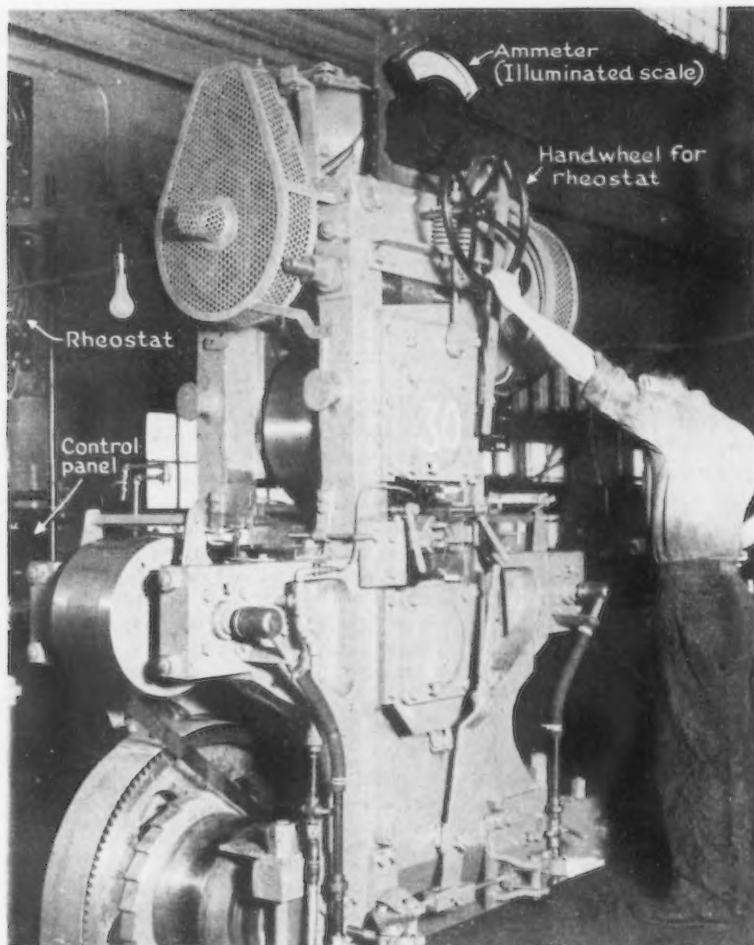
recting the dies and maintaining forging temperatures, a marked improvement was found in machinability. They then set out to determine whether, by filling the dies and controlling the flash, better machining characteristics could be obtained by further compression of the metal. Repeated hammerings improved machinability but etched specimens still showed that original cavities had not been entirely closed.

The next step was to work on a steel that might have more ductile fibers, or one promoting the flow of the metal without tearing. For this purpose steel bars were secured having McQuaid-Ehn grain-size ratings of 4 to 9. The bars were heated to 2100 deg. F. and different sized upsets were made on the end of the bar in

ratios of 1½ to 1, in ½-in. steps, up to 7 to 1. It was noted in these tests that the coarse-grained steels were more ductile and did not tear in upsetting, while the finer-grained steels tore and became more porous. In a word, the authors hold that the research proved that the fibers were more ductile in the coarse-grained steel than in the fine-grained, and that these more ductile fibers afford greater density in the forging.

The authors believe it is the cavities or voids in a forging that affect machinability. They regard the tool in the case of what may be called the porous forging as having a double duty to perform: first, to close the cavities with adjacent metal so that it has proper backing, and then to

(Concluded on Page 793)



In the small Steckel mill installation, a hand wheel at operator's command is on an extension of rheostat shaft. ▲ ▲ ▲

Controlling Operation of Steckel Mills

By F. MOHLER

Industrial Engineering Department,
General Electric Co.

THE Steckel mill is a precision machine for rolling exceedingly thin strip of very high quality, gage accuracy, and finish. An article in *THE IRON AGE* (Jan. 14, 1932) described the rolling principle and mechanical details. Only a brief description of the mill, and of those details affecting the electrical equipment, will be given here.

The mill consists essentially of two small working rolls, backed by two much larger rolls; two freely rotating cooling drums, over which the strip passes in traveling from the working rolls to the reels; two reels; the necessary gearing, and means for adjusting the draft. The strip is drawn through the rolls and wound up by one of the reels—the “leading” reel, while it unwinds from the other—the “trailing” reel. Thus all power for rolling is applied through the strip itself. This fact, in view of the thin gages and quality of strip rolled, necessitates very gradual application of tension when starting and accelerating.

It is desirable to arrange the equipment so that acceleration may be stopped at any speed for gaging or inspection. If a flaw appears in the strip, the equipment must be stopped very quickly to prevent possible damage to the rolls. This flexibility and

choice of the rate of acceleration or deceleration makes hand control very essential.

The only method of control which will give satisfactory operation under the above requirements is the so-called adjustable potential type. This scheme requires a separate, adjustable potential generator for use with the motor driving the mill. It will be described more fully later on. Rheostatic or constant potential control, whereby the motor is connected to a constant potential source of power through a resistor which is then short circuited in definite steps for starting, is not satisfactory.

From the standpoint of production, simplicity of equipment and manipulation are of utmost importance.

A further requirement is the use of back tension on the strip. This is necessary to obtain a flat, smooth strip of the proper quality and finish, and is an inherent feature of the rolling process. In addition, this prevents the “trailing” reel from over-running and unwinding too fast. In general, the power required for hold-back tension is approximately 10 per cent of that required for rolling.

There are two methods of obtaining this hold-back tension—by using friction brakes which the Cold Metal

Process Co. has developed for this purpose, and by using electric regenerative braking. When using the friction brake, the power required for hold-back tension is dissipated in the form of heat. By using the electric regeneration, the power, less the losses of the electrical machines, friction of the gearing, etc., is returned to the electrical system, and saved. The choice, of course, is a question of economy. On the smaller drives the initial cost of the necessary electrical equipment, mechanical arrangement, gearing, etc., greatly outweighs the saving in power obtained. However, the use of regenerative braking may cause an appreciable saving.

Steckel mills may be divided into two general classes—small and large mills. In the former class are the mills driven by motors ranging from 50 hp. to 200 hp., while the latter employ motors from 200 to 1750 hp., and larger. This is an arbitrary division, based on previous practice, and may be varied as occasion arises. However, it will serve to give an idea of the size of motors involved and the division of mills.

The accompanying illustrations cover a small mill, driven by a 100 hp.-550/1200 r.p.m. motor. A simplified diagram of this equipment is also given. The gearing and method of driving will bear a little consideration. It will be noted that the main gears rotate in opposite directions. The ratchet wheel and reel drum are combined into one solid part which is connected to the main gear through an engaging pawl. Thus, when operating in the direction indicated, the pawl for No. 1 reel is engaged, and the pawl for No. 2 reel is disengaged. It is not necessary to reverse the direction of rotation of the driving motor, but merely to engage one pawl

or the other. This is done by a lever which is discernible in the general view near the center of the mill.

The electrical equipment for the small mill consists of an adjustable speed d.-c. motor-generator set with direct connected exciter for supplying d.-c. power, a control panel, a hand-operated rheostat, an ammeter, an exciter field rheostat, and starting equipment for the synchronous motor driving the motor-generator set.

The control panel provides a line contactor for connecting the motor to the generator, an overload relay, a control relay for handling the coil circuit of the line contactor, a protective relay to prevent the closing of the line contactor, a protective relay to prevent the closing of the line contactor when there is voltage across the armature of either motor or generator, and a combination field and control switch.

From the simplified diagram it can be seen that the control of motor speed is obtained through the manipulation of the hand operated rheostat. When it is moved from the "off" position, the line contactor closes, connecting the motor to the generator. Continued turning of the handwheel first strengthens the field of the generator until full voltage is obtained, and then weakens the field of the motor until the desired rolling speed is reached. If the handwheel is returned in the other direction the motor field is gradually strengthened, then the generator field weakened, and finally the line contactor opened. A severe overload will cause the line contactor to open. However, the control is so arranged that the rheostat must be returned to the "off" position before it can be closed again.

Particular attention has been given to the design of the rheostat, here also illustrated. The construction is

▲ ▲ ▲

THE Steckel mill for rolling thin strip was described in respect to the rolling principles and mechanical details in **THE IRON AGE** of Jan. 14, 1932. The electrical side is more fully covered in the accompanying article, which discusses the arrangements for small speed changes under the immediate control of the operator as he is intent on watching the strip as it is in process. The control requirements include gradual application of tension on the strip in starting and in accelerating, and the need of quick stopping if flaws appear and damage to the rolls is likely to happen.

▼ ▼ ▼

rugged to withstand the severe mechanical and electrical wear imposed from practically continuous operation. Ball bearings and means for lubrication are provided and are arranged in such a manner that the rheostat operates without binding action.

The rheostat is placed back of the mill, as indicated in the general view of the mill, and connected to the handwheel by a shaft extension. The handwheel is located so the operator can reach it with either hand while observing the strip on either side of the working rolls. A large number of points are used in both the generator and motor field sections in order to give small increment changes in speed.

A large ammeter with illuminated

dial is placed on the mill housing for the convenience of the operator in determining the load on the motor, and thereby the approximate tension in the strip.

The control for the synchronous motor has been omitted from the diagram because any recognized type of control is satisfactory and a great deal has been published on this subject. The exact type depends upon the voltage, required interrupting capacity of the line breaker, personal preferences in regard to metering equipment, etc., for the small equipments. Some prefer to use induction-motor-driven motor-generator sets with full voltage starters.

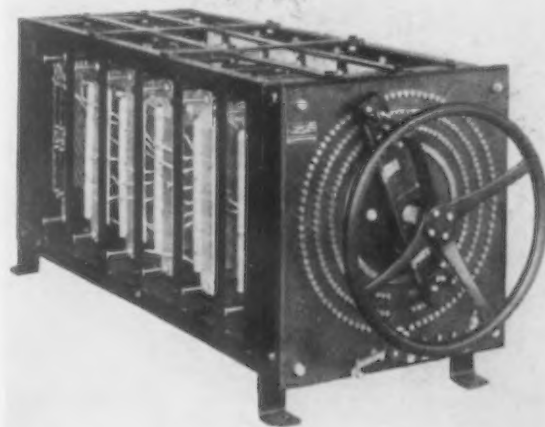
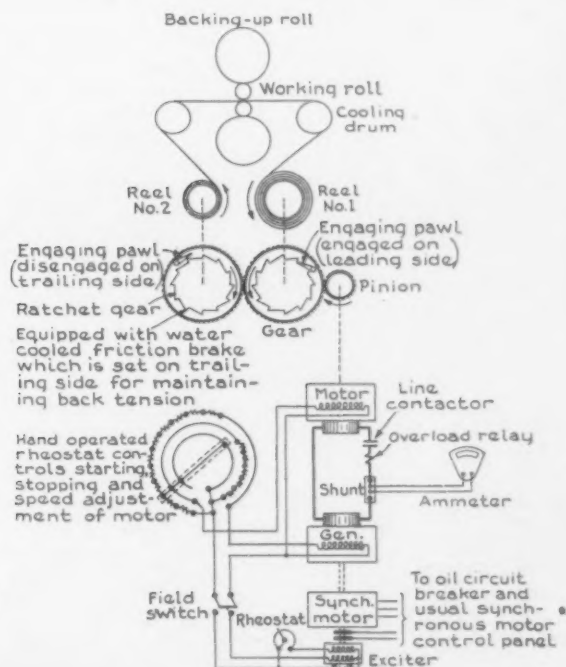
Control for Large Steckel Mills

One large mill has been installed and employs two 500-hp. motors, one for driving each reel. These motors are connected in parallel and are served by one 400-kw. generator. The leading motor pulls the strip through the rolls and the trailing motor acts as a regenerative brake for the maintenance of back tension.

The cooling drums are free to move vertically and each is supported on a scale beam mechanism. This can be adjusted for the required back tension by movable weights, in much the same manner as an ordinary scale for weighing materials. The scale beams, on either side of the mill, are connected to separate regulators which control the fields of the respective motors. However, only the regulator on the "trailing" side is operative during any one direction of rolling.

When the tension increases above the required amount, the scale beam operates the regulator so as to weaken the field of the "trailing" motor and this decreases the voltage and regenerative output. When the ten-

(Concluded on Page 793)



RHEOSTAT for small Steckel mill has ball bearings and a construction generally to meet severe mechanical and electrical wear.

Simplified diagram of a small Steckel mill shows the electrical speed control of the driving motor. ▲ ▲ ▲

Automatic Machines Speed Roller

By HERBERT R. SIMONDS

STANDARD roller chain, as manufactured by the Baldwin-Duckworth Mfg. Co., Springfield, Mass., is made up of two types of link units known as roller links and pin links. The roller links each have two side plates, two bushings and two rollers, while the pin links each have but four parts, namely, two side plates and two pins. All of these parts have been standardized so far as possible for different chain designs and the various manufacturing processes have been developed over a period of many years to give high-speed production and high quality. Many unique automatic operations have been introduced and the present production per minute is many times greater than it was a few years ago.

The side plates are first blanked from coiled steel strip stock on the automatic blanking machine shown in Fig. 1. Each stroke of the machine produces two blanks and the design of the die is such that these blanks are staggered to distribute the pressure. The width of the strip and the contour of the blank have been carefully studied and coordinated to produce a minimum of scrap. After blanking

the skeleton strip travels on beyond the dies through a small shearing mechanism at the left, which cuts it up into short lengths for greater ease in handling. This shear is operated from a cam on the main shaft.

An interesting feature utilized in many places throughout the manufacturing sequence is a long vertical magazine into which parts are received from one operation and delivered to a succeeding operation. In front of the blanking press in Fig. 1 two of these vertical magazines may be seen. The blanks as they are cut are forced down through the lower die, around a U-tube and up into the base of the magazines. When such magazines are full the press is automatically stopped. An operator then removes the magazines, replacing them with empty ones, and the full magazines are transferred to become the feeding magazines for another press operation.

Two Operations for Accuracy

Occasionally some sacrifice in high-speed production must be made to se-

cure greater accuracy. This is the case with the beveling and piercing of the side link blanks. These two operations could easily be performed on one machine, but it has been found that under such conditions there is a tendency in the beveling operation to slightly distort the holes; therefore, two machine are used for the two operations. These machines are shown in Fig. 2, in which the beveling operation is shown at the right.

Here the links from one of the vertical magazines are fed automatically on to the beveling die and after being beveled are forced up into another receiving magazine in a manner similar to that described for the blanking press. When a magazine on this machine is full, it is transferred to the piercing press shown at the left, where again the operation of feeding from the magazine to the dies is an automatic one. In this operation the holes are finish-pierced to precision limits.

Special Attachment For Pins

The production of link pins follows along parallel to that of side plates and the speed of production in both cases is coordinated so that the right proportion for the completed links will be maintained. The pins are cut from steel rods on automatic screw machines, but as both ends of each pin must be recessed to facilitate the heading operation when the links are assembled, an auxiliary tooling is necessary. The outer end of the pin is recessed in the usual manner by a tool held in the turret of the automatic screw machine.

This tool, of course, completes its cycle before the pin is cut from the end of the bar. After the pin has been formed it is cut off to exact size by tools mounted in the cross slide of the machine. However, just before the cut is completed an auxiliary arm attached to the upper structure of the machine and precisely timed to synchronize with the cutting operation swings down with humanlike motion and firmly grips the pin in time to hold it for the last second of the cutting-off operation. It then carries it upward to a recessing tool also attached to the upper structure of the machine and operated by a separate belt and pulley. Fig. 3 shows this recessing tool about to engage the pin. The operation is entirely automatic, and the pins as completed are dropped

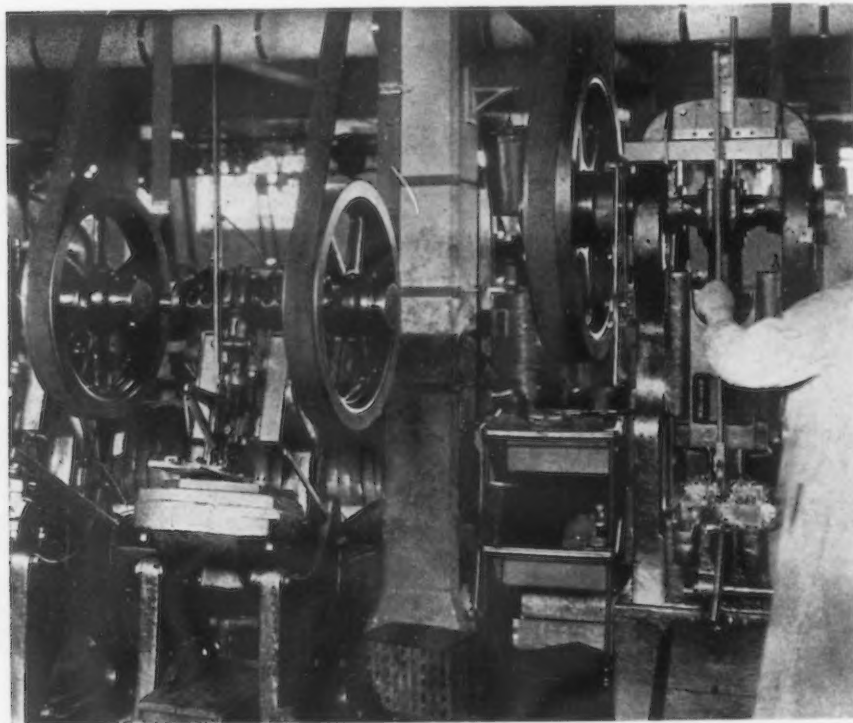


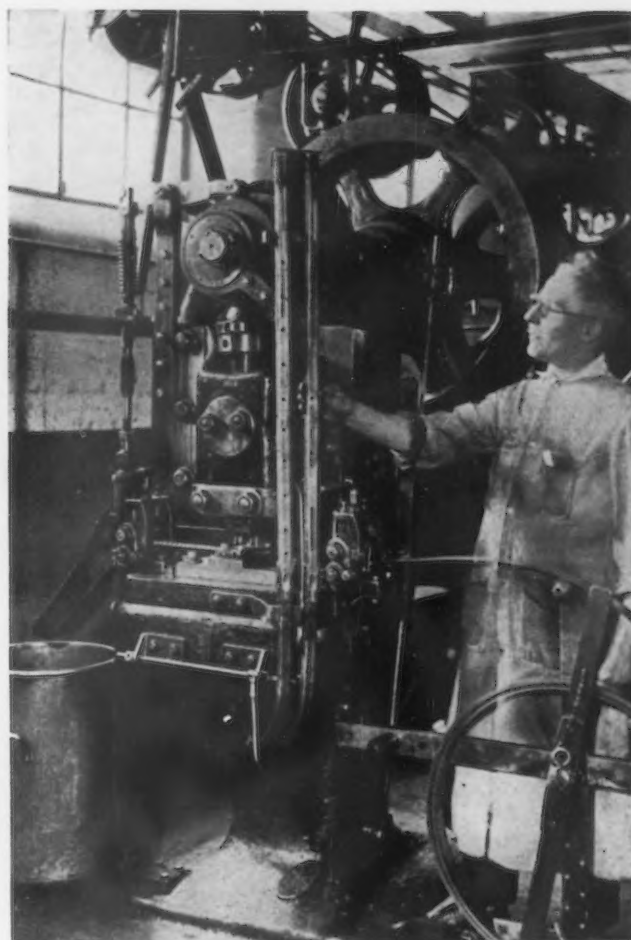
FIG. 2.—For greater accuracy separate machines are used for beveling and piercing.

Chain Production

WITH the introduction of the high-speed electric motor and individual drive came the demand for new means of power transmission. One of the results was the chain drive. This was originally perfected by Hans Renold, Manchester, England, in the early part of the nineteenth century. Since then the design of chain and sprockets has undergone many changes and improvements. Recently American chain manufacturers have taken long strides in perfecting heat treatment and precision machining methods in the production of roller chain. The accompanying description gives the highlights in the production of this type of chain at the modern plant of the Baldwin-Duckworth Mfg. Co.



FIG. 1.—Blanks for side links are automatically forced up into vertical magazines.



into a container at the side of the machine.

Instead of making the rollers from tubing it has been found advantageous to cut and form them from steel strip. This is done on ingenious automatic machines. The strip which is fed in from coils is bent to U-shape in the first die impression and then by a succession of forming and revolving operations the small accurate cylindrical rolls are produced. The joint in

these cylinders, which is unwelded, is nevertheless closed so tightly in the forming operation that it is scarcely discernible. The completed rollers drop into containers for transfer to the cleaning and heat-treating departments.

Both the side plates and the rollers are heat treated in horizontal rotary furnaces. The parts are fed in bulk into one end of a furnace and when they have slowly traversed the length of the revolving cylinder they are automatically dropped into an oil

quenching tank at the opposite end. The arrangement of furnace and tank is shown in Fig. 4. Each quenching tank contains three wire mesh baskets mounted on a revolving turret. As soon as one basket has been filled the turret makes a one-third revolution bringing an empty basket in position to receive the parts from the furnace. In the intermediate position the recently filled basket remains for an interval for cooling and in the final position the cool basket is removed and an empty one set in its place.

Handling of the baskets is done by chain hoists on an overhead trolley system. The method of handling of various parts throughout the plant has been given particular attention. Excess stocks in process have been reduced to a minimum, but the need for flexible operation and for filling orders for a large variety of sizes and designs has made it necessary to carry a fair-sized stock of parts in close proximity to the assembly department.

Automatic Assembling

Completed parts for special designs are stored in the steel rack shown in Fig. 5. This is built up of standard angles and straps and the tote boxes themselves are made of sheet steel. Each box, with its own particular place in the rack, slides in and out easily on the angle guides. The tote boxes are accessible from both sides

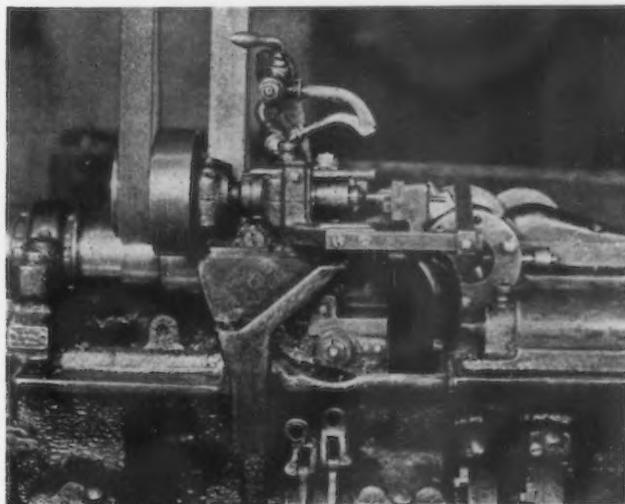


FIG. 3.—By means of an auxiliary attachment link pins with both ends recessed are produced automatically.

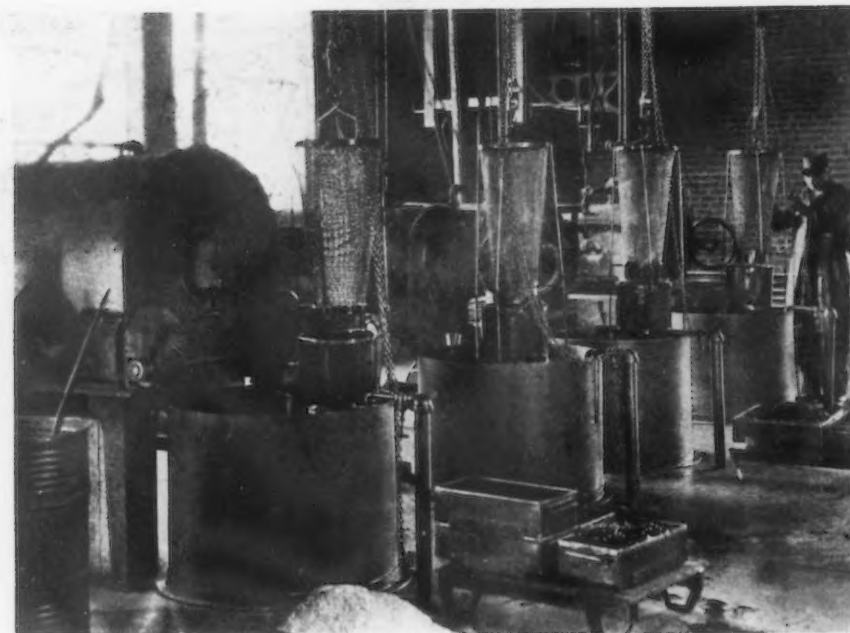


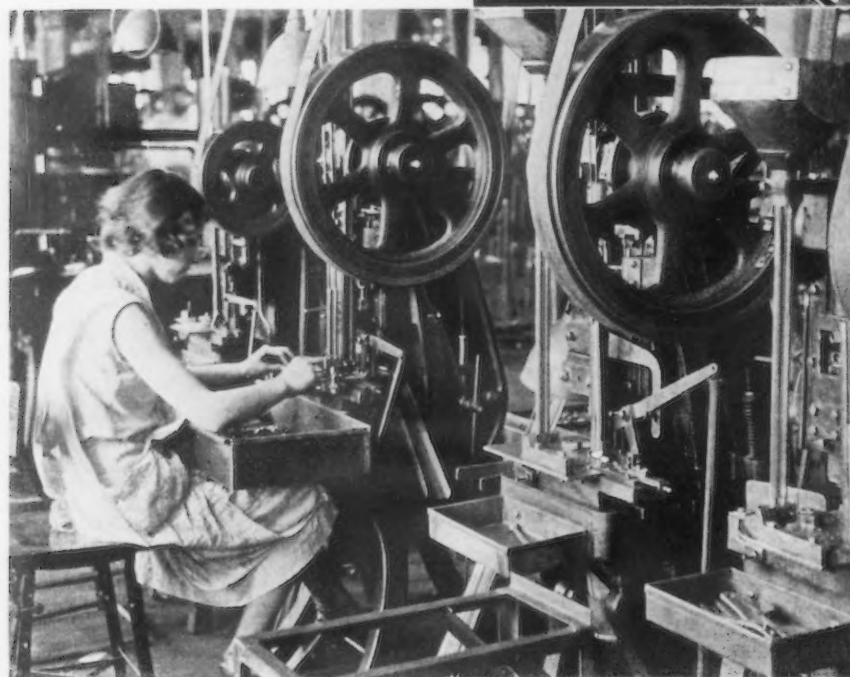
FIG. 4.—Horizontal rotating furnaces are used for heat treating roller chain parts.



FIG. 5.—Tote boxes and storage racks have been carefully designed for maximum convenience.



FIG. 6.—Many ingenious automatic and semi-automatic assembling operations have been developed for the various types of roller chain.



of the rack and each box is carefully labeled with a colored tag to indicate the particular size and type of part carried. Other racks of similar design are used for the parts of standard types of chain.

Because of the many special designs of links, assembling operations are often highly complicated. Wherever possible automatic assembling has been accomplished and in other cases semi-automatic operations are used. Usually the parts to be assembled which are stored in bulk are dumped into specially designed, rotating hoppers which automatically select the parts one at a time in a predetermined position and feed them into magazines from which they may be automatically fed to the assembling machines. Fig. 6 shows an operator at a semi-automatic machine assembling roller links.

Each link as explained consists of two side plates, two bushings and two

rollers. The rollers are fed from magazine wires into a rotating fixture where they meet the side plates which are pushed into the same rotating fixture in correct position to receive the rollers. The operator inserts a unit consisting of two bushings and one side plate into the rollers as the fixture revolves, and a punch on the ram of the press drives the other side plate on to the bushings making a complete roller link unit. The machines in the foreground of Fig. 6 are full automatic pin link assembling machines requiring practically no attention. Another machine somewhat similar to those shown assembles the various completed link units into the finished roller chain of any desired length.

Monorail System

Effects Great

Savings

in Warehouse

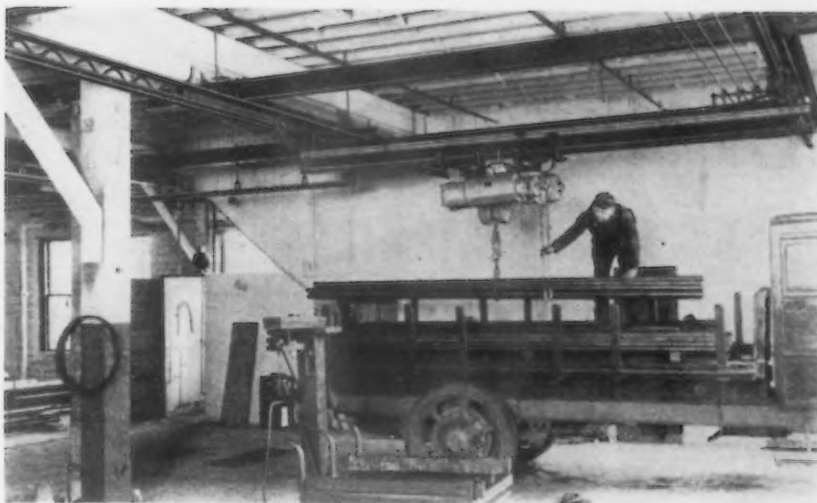


FIG. 1

GREAT saving in labor in handling steel in warehouse has been effected by Super Steels, Inc., Cleveland, by the installation of a system of monorail tracks and two 2-ton electric hoists, supplemented by several 3000-lb. chain hoists which serve the entire warehouse floor. With the use of the conveying equipment one man is able to do all the handling of steel in filling orders that formerly required several men. The stock is all special and alloy steels and the orders are small, often only for one or two pieces to be cut to length.

The warehouse is 130 ft. long and 100 ft. wide and divided into four bays each served by a monorail and chain hoist. The larger sections are stored in floor bins located in three bays wide enough to stock 25-ft. lengths. Along the side wall in a fourth bay are 500 steel pigeon holes for holding the smaller sections in lengths up to 16 ft.

Across the front of the warehouse is an overhead transfer crane. This is shown in Fig. 1 unloading steel from the truck. This crane interlocks at three points with sections of monorail about 6 ft. long. The other ends of these short monorail tracks connect through a header track and switches with the monorails that extend the length of the bays. A loaded electric hoist may run straight down through the bay at one of the interlocking points, or may be switched to the header track from which it moves over another switch to a track serving one of the various adjoining bays. This is illustrated in Fig. 2 showing the interlocking arrangement.

In filling an order the bar is carried from stock to a shear at the front of the warehouse in the section occupied by the transfer crane (shown in Fig. 3), pieces are cut to the required length and the remainder of the bar is taken back to the stock bin. The stock is cut on a cold saw having a

capacity for cutting rounds up to 10 in. in diameter. The warehouse man usually has the aid of one helper whose work is mainly in assisting in cutting stock.

The conveying system was installed by the American MonoRail Co., Cleveland.

Research Paper No. 496 in the November number of the Bureau of Standards Journal of Research describes the hydrochloric acid residue method used at the Bureau of the determination of the silica and alumina of non-metallic inclusions in steels. Comparative analyses of six steels show that this method yields results which compare favorably with those obtained by the bromine and nitric acid residue methods. Of the three methods, the hydrochloric acid method is preferred chiefly on the grounds of speed and simplicity of operation.

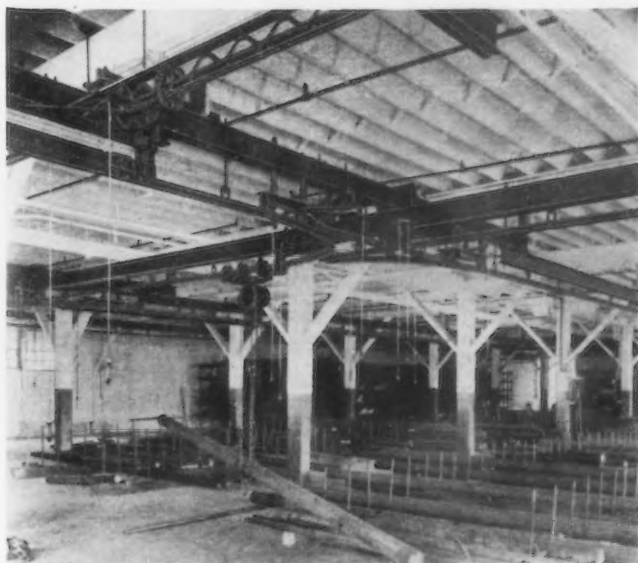


FIG. 2



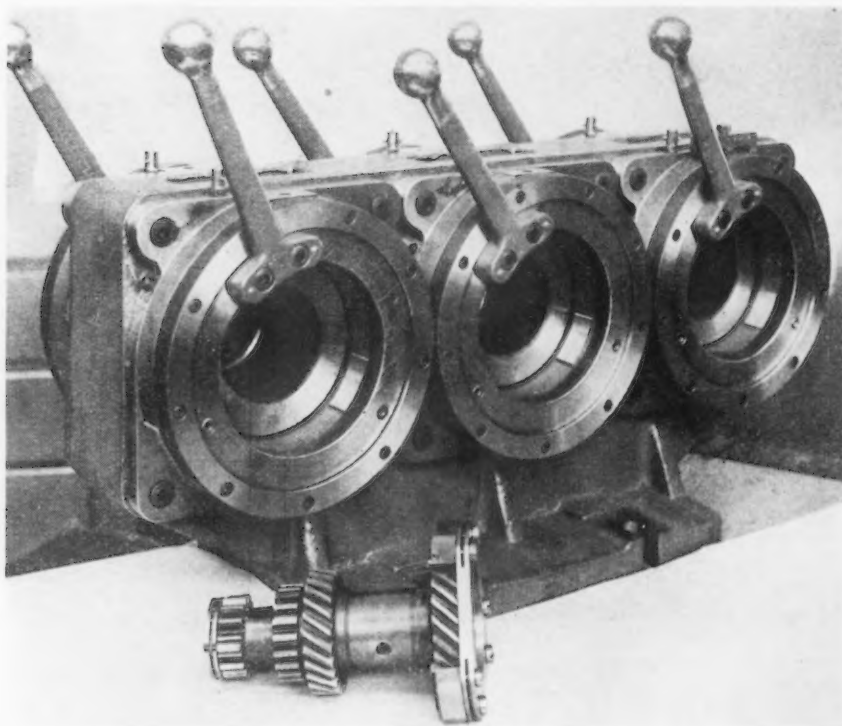
FIG. 3

"Better Times"—

(Tenth in a series of "Performance Pages" as selected from actual practice by The Iron Age Editors)

OPERATION: Precision Boring

PRODUCTION EQUIPMENT: Heald Boremetics



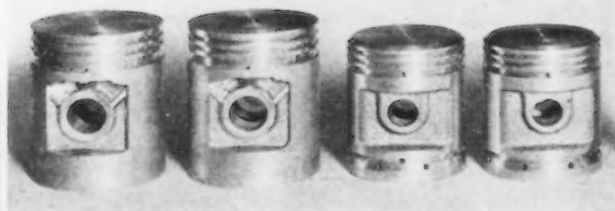
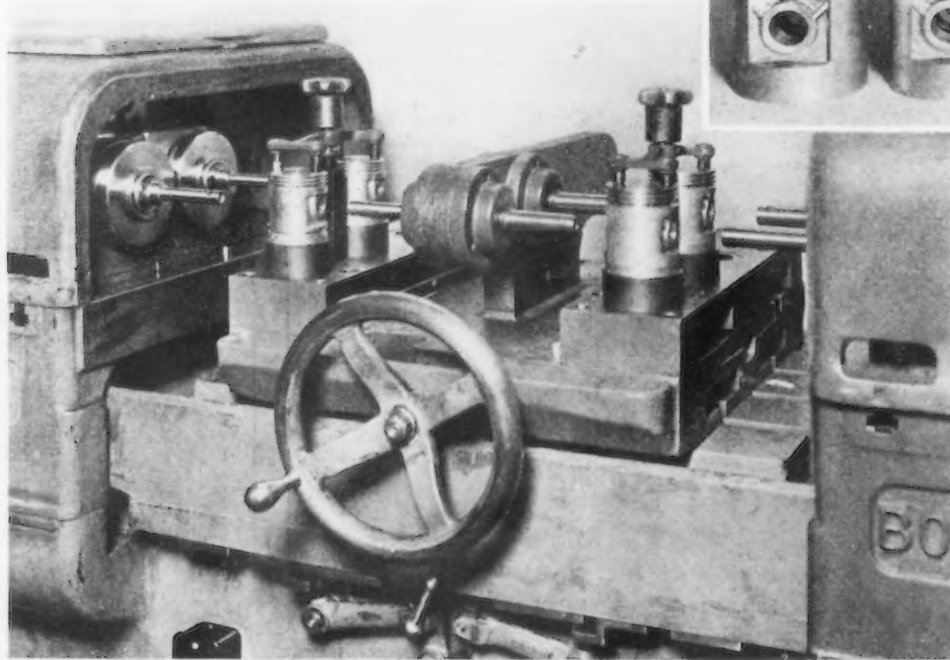
"BORIZING" is a term coined by the manufacturer to cover the operation here shown. The tools are designed essentially to give smooth finish and dimensional accuracy to an internal surface already bored. The comparison of production speed is with one or more other types of machines previously required to produce the same accuracy and quality of surface.

Smooth finish boring or "borizing" is a relatively slow operation, yet an increase in production speed by as much as 800 per cent has been attained in some cases. The examples shown in this tenth presentation of "Better Times" are taken from actual present-day operating practice and comparison is with good practice immediately preceding the introduction of the new method.

Cluster Gear with Bronze Bushing

Production time—144 per hour per machine.

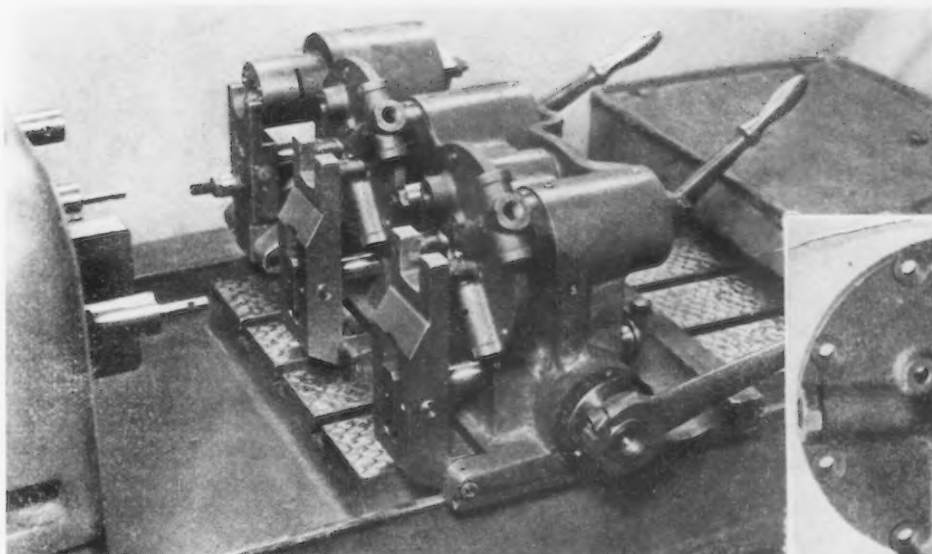
Previous method—24 per hour per machine.



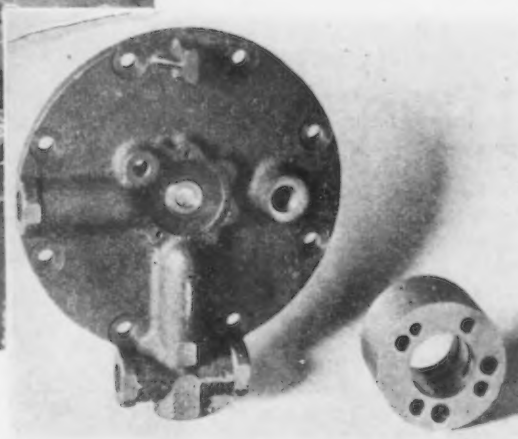
Aluminum Parts

Production time — 265 pieces per hour per machine.

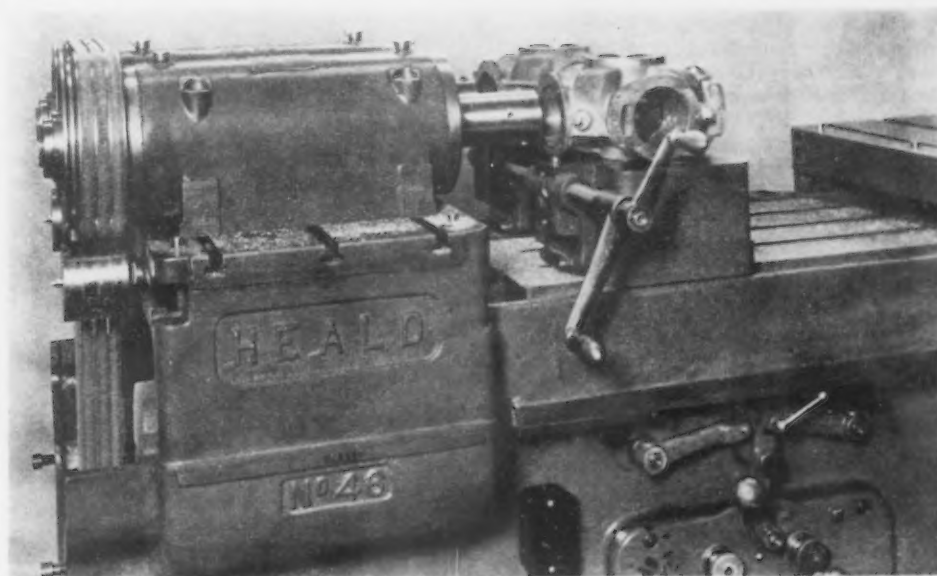
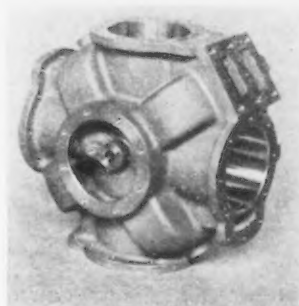
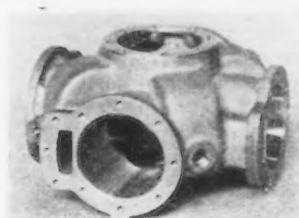
Previous method — 100 pieces per hour per machine.



Refrigerator Parts
Cast iron head with
bronze bushing bored and
faced

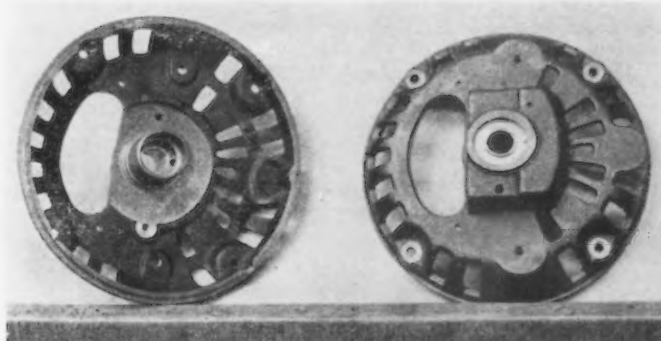


Production time—80 pieces per hour per machine.
Previous method—10 pieces per hour per machine.



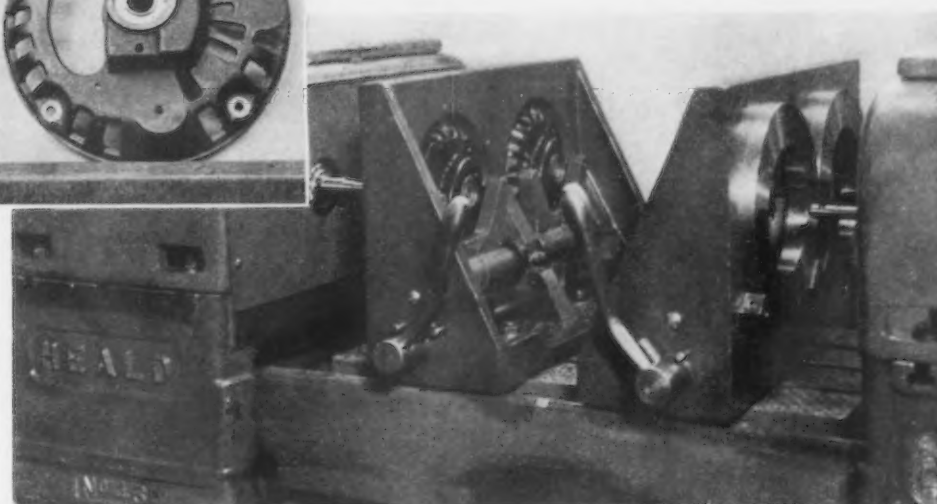
Bronze Gasoline Meter Body

Production time—30 pieces per hour per machine.
Previous method—4 pieces per hour per machine.



Motor End Shield
Babbitt Lined Bore

Production time—200 pieces
per hour per machine.
Previous method—25 pieces
per hour per machine.



Study of Production Methods as In

IT is not uncommon for a manufacturer to buy new equipment with the expectation that output will be increased and cost lowered, and then to be disappointed because unknowingly he does not give the new machines a fair chance to do the work of which they are capable. Sometimes it is a matter of educating the operator; sometimes a jig or fixture is at fault. On the other hand, cutting tools may not be right, or the lack of understanding of cutting speeds may result in poor work and low production.

The problem simmers down to close attention to practices and their revision where needed. It may be said that study of production methods is less important today than when demand is up. But is that really the case? It is true that capacity is now nowhere near engaged, but it stands to reason that if a machine can be made to earn more when in actual operation it will carry fixed charges for a part if not all of the time when it must of necessity remain idle, whereas the machine which is not worked to capacity will in most instances carry its overhead only when operating. Therefore in times such as these, with enforced machine idleness, efficient operation is certainly as important and possibly more so than in boom times.

Savings Sometimes Double Fixed Charges on Machine

Although the element of saving enters in, still the problem is attacked

By **CRIS BERG**
Consulting Engineer, Chicago

primarily from the angle of increased earning power of the machine. This viewpoint accounts for the interesting condition whereby apparent savings will sometimes be more than double the fixed charges on a machine.

An illustration of this kind is afforded by the manufacture of a special gear on which total shop cost, not including material, had totaled \$1.60 an hour. After production methods had been revamped there was a saving of over \$3.40 an hour, or more than double the actual cost by old methods.

First Output Disappointing

This gear is cut from a cast iron cup-like blank $3\frac{1}{4}$ in. in diameter. Eleven teeth or splines, $1\frac{1}{4}$ in. deep, are cut in the rim, which is $\frac{5}{16}$ in. thick. This part is first drilled and reamed for a short $\frac{1}{2}$ -in. steel shaft. Cutting these teeth was first performed on an old general-type hand-indexed machine on which it was possible to produce only 40 pieces per day. It was apparent that new equipment was needed and about \$5,000 was spent for a stub lathe of such design that it was used as a miller. It was self-indexing and equipped with Oil-gear feed. The variation between teeth was not to exceed 0.004 in.

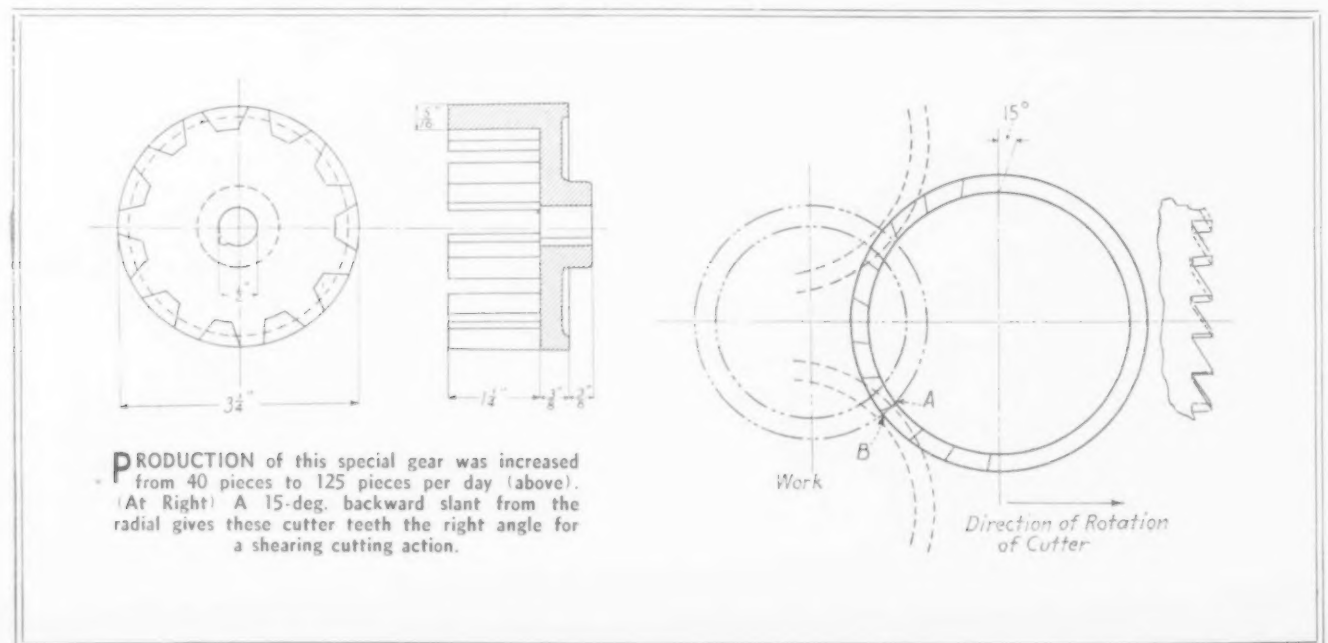
First attempts to increase produc-

tion on the new machine resulted in too wide a variation, with the astonishing outcome that output was lowered until production reached that of the old machine and on the face of things it seemed that money had been wasted on new equipment.

Shop men contended that the teeth sprung under heavy cuts and feeds and therefore the fault was incurable, because it rested in the inability of the part itself to stand up under high-production methods. Further, they hesitated to go the limit on this machine, fearing it would not stand up under the strain.

A little study and gaging disclosed that there was practically no difference between the measurements at the top and at the bottom of a tooth, but there was considerable difference between the first and last tooth cut. This indicated that spring in the part was not the trouble, but rather that the part was turning in the holding device.

Parts were mounted in a chuck on an arbor, which was drawn tight by a nut on the back side of the index head. It was noticed that if a part was slightly oversize and fitted snugly in the face-plate recess there was far less variation than when the part was true to size or undersize. Therefore inaccuracy varied widely, being at times more than 0.004 in. The cutter speed was 110 ft. per min. and the feed $2\frac{1}{2}$ in. per min. A heavy stream of cutting fluid was used.



as Important Now as in Boom Times ▲ ▲ ▲

The first corrective step was to change the cutting angle of the cutter teeth to give a slicing or shearing, rather than a pushing, effect. The result of this move was smooth edges at the corners of the teeth. Then the lubricating fluid was cut off. This resulted in a dry plate against which the part was held. This increased the friction between the part and the plate with the result that the part could be held against turning while being cut.

Changes Increase Output of Special Gears

The final change was made in the speeds of the machine. The cutter speed was reduced to 75 ft. per min. and the feed in was increased to 18 in. per min. Under these conditions the variation between the first and the last tooth did not exceed 0.016 in., which was not acceptable. Therefore it was decided to make a second cut of 0.020 in. on the sides of the teeth to correct the variation. The machine, operating automatically, was made to take the second cut by removing a 0.020 in. shim between the stop and the carriage. By this method an article was produced that could be constantly held to a 0.001 in. variation. Now what about production? It had been increased to 125 pieces in a 9-hr. day. The machine had actually been put to work.

Rough Edges on Gear Teeth Corrected

In order to increase the feed to the proper amount on this job the thickness of chip cut by each tooth on the hollow mill would be such that quite a piece of the metal would break out at the end of each chip and leave a rough edge at *A* and *B*, Fig. 2. As a rough edge along the teeth of the gear could not be tolerated, it was necessary to find some means of overcoming this difficulty before a step-up in production could be attempted. It would have been quite useless to have high production of a quality not fit for use, and if a single piece of this sort was turned out it would receive the customary shop comment, "We knew it; it can't be done." Further, the next step to fix the cutter would be received with some disbelief. Inasmuch as this matter had to be attended to, it was easier to fix up the cutter before starting than later. It does little good to delay a thing of this kind only to verify things that are well known beforehand.

As can be seen on the diagram, the contour on both sides of the gear tooth is made or cut by the inside or *A* edge of the cutter tooth. It is

INSTALLATION of new equipment with increased production capacity is here shown to pay even in times of reduced operations. In the case cited, a new machine stepped up production from 40 to 125 pieces per 9-hr. day and effected a gross saving of \$3.41 an hour, which was double the actual shop cost. Even with the machine operating only one-third of the time, the cost per piece will not exceed that of the old practice. In addition, when normal operation is resumed the new equipment will accumulate a surplus of earnings that will offset in whole or in part the fixed charges accruing in periods of idleness.

therefore necessary to get a smooth edge on the work at *A*, and as the cutter is not the full width of the space between the teeth of the gear it does not greatly matter if the edge at *B* is rough, as this material is removed by the *A* edge when the contour of the next tooth is cut.

Gross Saving of \$3.41 Per Hour Realized

To get this condition the face of the cutter teeth was ground with a 15-deg. backward slant from radial. This brings the *A* point of the tooth through the work ahead of *B* while there is still enough solid material left on the *B* side of the chip, giving more of a shearing action, and the end of the chip does not break out the entire width of the cutter tooth *A* to *B*, only a piece at the *B* edge being pushed out.

Here is what happened to the earning power of this machine: With a labor rate of 60c. per hr. and all fixed charges \$1 per hr., the total shop cost was \$1.60 per hr. Material is not included in this figure. At the rate of 40 pieces in 9 hr. there were produced 4.4 pieces in one hour and the shop cost per piece was 36c.

By producing at the rate of 125 pieces per 9-hr. day there were made 13.9 pieces an hour at a shop cost of 11½c. per piece. The saving per piece was 36c. minus 11½c., or 24½c. With 13.9 pieces being produced each hour at a saving per piece of 24.5c., the gross saving per hour was 13.9 x 24.5c., or \$3.41. It should be noted that this saving was more than double the actual shop cost.

Increased Capacity Fully Warranted in Dull Times

It stands to reason that if this machine produced only one-third of the time the shop charge would be unaltered. However, by increasing the capacity of the machine and thereby increasing its earning capacity there

is in normal times the accumulation of surplus earnings which will help tide over the periods, such as at present, when output must be curtailed. That is, in dull times this machine can still operate only about one-third of the time and not have the cost per piece go above that of the old practice.

These possibilities lie not alone in buying new equipment, but in getting the full benefits from the machinery bought. If this is done there results a storing up of earnings that iron out the irregularities of low production periods.

Similar Savings Made from Old Machines

It often happens that savings like the above can be made on old machines. An old gear hobber was producing 50 pieces a day at a shop cost of 25½c. per piece. By raising machine speeds and feeds it was possible to get 120 pieces a day at a shop cost of 11.7c. per piece, or a saving of 13.8c. per piece. The saving per hour was \$1.66, against a shop cost, including labor at 60c. per hr. of \$1.40 per hr. The shop men, bound by habit, would not believe this could be done until induced to make a trial by being shown a comparison of the thickness of chip made by the hobbing cutter with a chip made by a lathe tool. There had also been here the workman's fear of breaking the machine if its output was increased above the old rate.

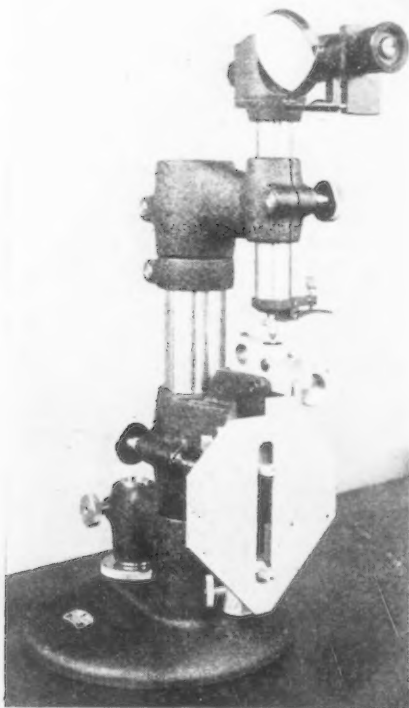
Economies of the kind outlined are not alone economies to be sought in periods of peak production. The shop that put them into effect a year or two ago is ahead of the game at this time. Economies are the order of the day not because there is a clamor for higher output, but because production is low and fixed charges are increasingly burdensome. Also because all market prices are down and the existence of a manufacturer depends on producing at a profit.

Internal Attachment for Zeiss Optimeter

BY means of a new internal attachment, the standard Zeiss vertical Optimeter, heretofore limited to outside measurements, can be converted readily into an inside comparator gage. With this attachment bores as small as $\frac{1}{4}$ in. and as large as 4 in. can be checked to an accuracy within 0.00005 in. Means are provided for determining taper and for finding both minimum and maximum diameters of bore.

The attachment is self-contained and is made to fit any standard Optimeter including those now in use, simply by slipping it over the vertical post and clamping it in position at the rear of the instrument. There are two measuring jaws, which contact by means of ball tips with the ring to be gaged. The ring is suspended on the upper jaw, which although adjustable, is fixed in position during the measuring operation. The lower jaw effects the measuring motion and transfers it to the measuring anvil of the Optimeter tube, by which the amplification is performed optically so that $1/10,000$ of an inch will appear as large as $1/16$ in. in the ocular, or as $\frac{1}{8}$ in. when projected on the screen.

Taper of bore is observed visibly by shifting the back-plate in and out. The maximum diameter is determined by slightly swinging the ring with the upper contact tip as a pivot. The minimum diameter is found by tilting the back-plate in a vertical plane. The instrument is set either with a mas-



The internal attachment adapts the optical amplifying gage, for inside gaging of bores ranging from $\frac{1}{4}$ to 4 in.

ter ring or a snap gage built up from gage blocks. Independent fine adjustment for the zero position is provided underneath the measuring anvil. Both the Optimeter and the internal attachment are marketed in the United States by the George Scherr Co. 128 Lafayette Street, New York.

Valve to Prevent Waste of Compressed Air

FOR use in shops and foundries, as well as in railroad yards and engine houses, the Murdock Mfg. & Supply Co., Cincinnati, is offering the Q.O.C. air valve illustrated, which, in stopping air leakage, is said to decrease the cost of both air and maintenance.



THE valve cannot be left partly open, nor can it be jammed in its seat

The valve is of sturdy construction and the design is such that it cannot be left partly open, because the instant the cam is turned past center the pressure and spring close the valve, which is held tight, as well as closed, by pressure. The spring is an auxiliary in case the valve is installed in a horizontal or diagonal position. The valve cannot be forced or jammed at the seat because the instant it is down the cam is disengaged. The vertical action is emphasized as eliminating friction at the seat. Regrinding is not required. Tested under 100 lb. pressure one of these valves is said to have been still tight after being opened and closed 30,000 times at the rate of 40 full operations a minute.

The valve disk is easily renewed if necessary and the gland or stuffing box can be repacked without removing the valve from the line or shutting off the air. The camshaft is of hard bronze and the operating handle is of steel; other parts are of red brass. Sizes range from $\frac{1}{2}$ to 2 in.

This valve is not recommended for water because of its quick closing and possible shock to the pipe line.

New Ball-Bearing Pedestal

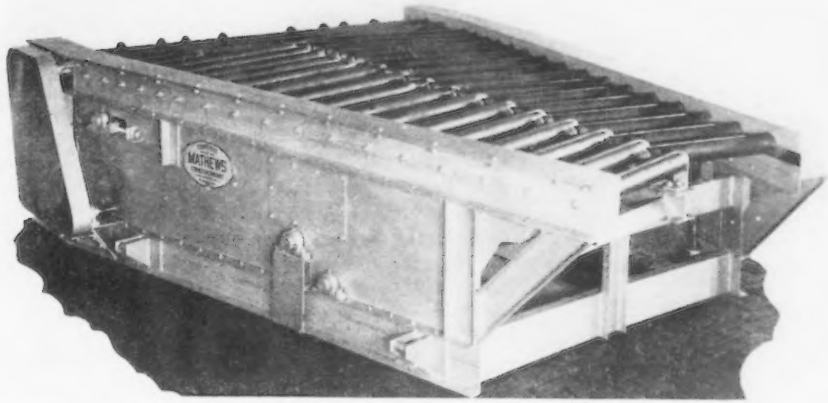
THE LUP series unit pedestals for pillow blocks recently brought out by the Norma-Hoffmann Bearings Corp., Stamford, Conn., is designed to meet all average industrial requirements, and is made in sizes to fit standard shafting in nominal inch as well as sixteenth diameters, from $15/16$ to $3\frac{1}{2}$ in. The ball bearings are the company's standard "Precision" double-row self-aligning type with adapter sleeve. The pedestals have large lubricant capacity, with fittings for replenishing as needed. Protecting felt seals prevent escape of lubricant along the shaft. The pedestals may be had with the bearings either floating or fixed in the housing.

Redesigns Line of Automatic Dial Scales

THE Kron Co., Bridgeport, Conn., has completed redesign of its line of automatic dial scales, which includes portable and dormant platform, bench, hanging pan, track, hopper, crane and other types of scales.

The indicating mechanism has been simplified. The number of bearings has been reduced to eight, six of which are ball bearings especially designed for scale mechanism application. The advantage obtained is said to be that all bearings in the scale mechanism are supported in every direction. The sector and pinion design is said to be such that no variation is possible in the mesh of the gearing, which makes for continued accuracy. A device for absorbing vibration which might be transmitted to the scale pointer is a feature that makes for easier and more accurate readings. The entire dial head is completely sealed to prevent entrance of dust and moisture. It is arranged to swivel 360 deg. so that it may be turned to and read conveniently from any direction. Platform designs have been simplified in some cases with the elimination of intermediate levers. In certain types overhead lever systems have been improved.





Herringbone Run-Out Table for Sheet Mills

FOR producing sheet steel by means of the "combination system," involving the use of continuous furnaces, conveyors and mechanical handling apparatus, the Mathews Conveyor Co., Ellwood City, Pa., in conjunction with the Wean Engineering Co., Inc., Warren, Ohio, has developed a herringbone run-out conveyor for handling hot sheets between double pack furnaces and a feeder table located immediately in front of the rolling mill.

The hot sheets or packs leaving the furnace are carried forward directly in line with the furnace chains by the long rollers directly across the furnace doors. The purpose of these rollers is to remove the sheets far enough so that when the sheets come in contact with the rolls set at an angle, there is no motion of the sheet across the furnace chains. The first three rollers and their bearings are water cooled. Disks are used on the first roller to get as close to the furnace chain as possible and assure a proper receive of the sheet. Due to the excessive length, the rollers are supported in the center by a set of auxiliary rollers. The rollers in the main herringbone are set at an angle dependent upon the width of the furnace and the distance between the furnace and the conveyor feeding the mill. On each side the rollers pass through scalloped guards so that the sheets as they emerge from the furnace will be forced to travel within the limit set by these guards. Actually, however, the guards are rarely touched by the traveling sheet because the sheet tends to be carried away from the guard, due to the angle at which the rollers are set. At the same time the sheet has its major axis retained parallel to the centerline of the furnace.

Since time is a vital factor, because the heat of the sheet must be retained, the surface speed of these tables is considerably greater than the speed of the chains in the furnace. In the unit here illustrated the speed is 250 ft.

per min., but tables have been built with speeds up to 330 ft. per min. All the rollers are mounted in ball bearings on dead axles.

The driving is done by means of a roller chain passing over the top of sprockets welded to the roller. This chain is held in place by a guard over the top and the entire chain runs through an oil bath. Guards are located on the cover plate and a cone is welded to the tube to prevent passage of oil along the tube. Tables are built either with individual motor drives for each side of the table or with one central drive.

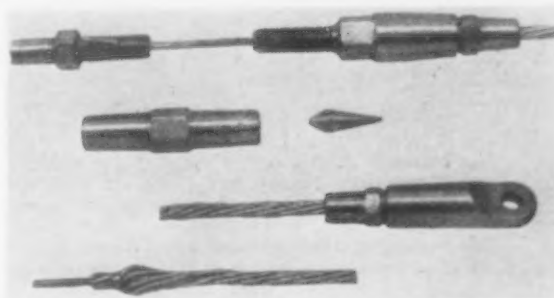
When the furnace width is excessive, the tables are built in two sections split through the center to facilitate handling.

The particular unit illustrated was furnished to the Wean Engineering Co., Inc., for installation in the plant of the Tata Iron & Steel Co. in India.

Expands Line of Cable Fittings

CABLE fittings to cover all general applications from the small airplane strand to the large industrial type of cable are now manufactured by the Fiege Co., Green Bay, Wis. These cable and wire rope fittings are forged of S.A.E. 1020 hot-rolled steel

SPECIAL tools are not needed to attach the fittings to the cables. Cadmium plating prevents oxidation of the steel



with copper alloy. They are simple in construction, can be attached without the use of hot metal or special tools. Cadmium plating prevents oxidation of the steel.

Method of attaching sockets to standard wire rope requires the placement of two wire seizings, after which the end seizing is removed and the strands broomed out so that the hemp core can be removed. The strands must then be thoroughly cleaned with gasoline and wiped dry. The broomed ends are held together while the end of the cable is inserted in the sleeve, after which an insert center plug is gently tapped in place. The wires are then drawn over the plug and secured with a small soft wire. The outer shell is then screwed down by hand until wrenches are needed.

Monarch Lathes Now Oiled Automatically

AUTOMATIC force feed lubrication for the bed, carriage, apron and compound rest is now standard on all lathes built by the Monarch Machine Tool Co., Sidney, Ohio.

Of the 14 places that need occasional oiling attention, two require oil once a year, five require oil once a week and seven require oil twice a week. Major units are oiled by centralized lubrication systems, all parts of which are built-in and concealed.

The oil reservoir in the bottom of the apron holds from 1 to 2 gal. depending upon the size of the lathe. A pressure pump driven automatically by the apron handwheel supplies oil under pressure to every part of the carriage as it bears upon the bed, and to the compound rest bottom-slide bearings of the carriage. The amount of oil is "metered" to each point. A reservoir in the top of the apron is filled automatically, and supplies oil through tubes to all apron roller bearings. The large apron gears dip in the reservoir and carry oil to the entire gear train.

Lubrication of the headstock is by a splash system that requires attention only once a year. Filtered oil is supplied automatically to the Timken spindle bearings. The quick-change gear box is oiled from central reservoirs which are filled once a week.

Self-Contained Hydraulic Forming Press

THE self-contained hydraulic forming, bending and drawing press illustrated was installed recently by the Chance Vought Corp., division of the United Aircraft & Transport Corp., Hartford, Conn., primarily for forming the streamline boots for airplane struts designed to lessen wind resistance. The machine was built by the Farrel-Birmingham Co., Ansonia, Conn. Features include smooth and positive action under any load, absence of vibration and noise, minimum floor space requirements, and low installation costs. The pressure, stroke and the amount of opening between the platens can be varied at will to suit diverse operating conditions.

The press is of 200-ton capacity and has a 24-in. diameter ram with a stroke of 24-in. The single cylinder is of double-acting type and its piston is equipped with hammered piston rings. The 49½ x 80-in. moving piston, the bottom platen and the top crosshead are made of alloy iron castings. The moving piston is equipped with renewable wearing bushings that have Alemite fittings for lubrication. The bottom platen forms the base of the press.

The operating medium is oil, which is contained in a large welded steel

tank on top of the press and is supplied to the cylinder by a motor driven pump, also mounted on top of the press. Ram pressure is adjustable by means of quick-resetting relief valves. There are no operating

valves, all movements being controlled by a pendant switch with push buttons for "start," "stop" and "reverse." The pendant switch can be swung to various positions about the press to suit the convenience of the operator. This electrical control also enables the operator to "inch" the moving platen when setting dies. A limit switch prevents over-travel on the up stroke. An automatic timing device that will give a dwell of any desired length at the end of the stroke can be furnished.

Builds Station-Type Hydraulic-Feed Drillers

THE National Automatic Tool Co., Richmond, Ind., is offering a new station-type hydraulic-feed multiple-spindle drilling machine arranged with either three, six or eight stations and with horizontal as well as vertical hydraulic-feed drilling units. The particular machine illustrated has six stations, four working and two loading, and is equipped with four vertical and four horizontal drilling heads. It performs 132 different drilling and countersinking operations in the bottom and manifold side of a cast iron cylinder block at a rate of approximately 75 an hour.

Indexing of the table from station to station is accomplished by an automatic mechanical indexing mechanism, and the entire machine is so in-

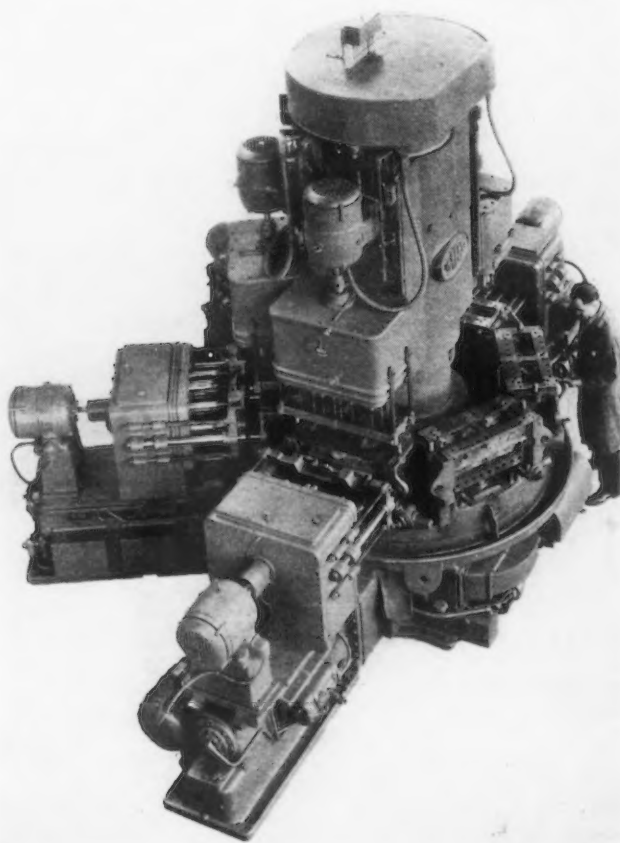
terlocked that the indexing mechanism will not function unless all heads, both vertical and horizontal, are in their correct positions. The Natco Hydro Uni-Power system of hydraulic feed employed is semi-automatic in operation. The machine is completely controlled from one push button station. All heads are of quick-change type, and all spindles are roller-bearing mounted and arranged with nose adjustment. The weight of the machine illustrated is approximately 62,000 lb.

Ajax Electrothermic Corp., Trenton, N. J., has licensed the Westinghouse Electric & Mfg. Co. to make high frequency or coreless induction furnaces or heaters for certain applications in the field of heating. The Ajax corporation has in turn received a license from the Westinghouse company to use certain patents of the latter company.



The hydraulic press above is actuated by individual pump equipment. Pressure and stroke are adjustable and control is centralized in a simple pendant switch

The machine at right performs 132 different drilling and countersinking operations in a cast iron cylinder block



Putting the Question Mark to Work

Idle Wire Ropes

In starting up some of our rope drives which have been idle for some time, how are we to know that they are safe?

R. C. D.

MOST manufacturers who shut down machinery pay no more attention to the wire ropes which may be on the machinery than to any other part of the equipment. In case solid steel parts are attacked by rust or corrosion during inactivity, this is readily seen and corrected, but it is not so with wire rope in which practically all parts constitute bearing surfaces subject to corrosion. If these surfaces are unprotected, each idle day means so much rope life gone. The best protection is thorough and correct lubrication. Our advice is to reduce the time between inspections and to continue periodical lubrication just as if the rope were in regular service.

A. J. Morgan, Chief Engineer, Wire Rope Department, John A. Roebling's Sons Co., Trenton, N. J.

Drying Thin Sheets

Can you suggest the best method for drying 30-gage sheets after pickling? We have had difficulty with water stains or discoloration, which affects subsequent tin plating.

C. H. C.
England.

WE have found it extremely difficult completely to eliminate water stain in drying sheets. To begin with, water, hot or cold, has impurities unless distilled, and few plants can afford such added expense. With fairly pure water, satisfactory results can often be secured through thorough rinsing, using lots of water and several immersions. As soon as the water becomes slightly contaminated, it is apt to cause discoloration.

Despatch Oven Co., Chicago.

Painting Galvanized Sheets

We have had trouble painting new galvanized sheets. Can you refer us to a paint that may be used satisfactorily?

K. R. T.

WE are using a new type of paint which we find highly successful in painting and adhering to new galvanized sheets. We do not manufacture this paint, but we use it regularly in connection with coating new galvanized steel ventilators and similar products.

American Steel Band Co., Pittsburgh.

TYPICAL QUESTIONS

"How can we reduce pitting when pickling?" "How can we waterproof concrete?" "What steel alloy has a very low coefficient of thermal expansion?" "What fuel oil consumption should a 20-ton open-hearth furnace have?" "How can I determine the correct forging temperature?" "Is there an enamel for galvanized sheets?"

These are typical of the many questions which are constantly being received and answered in our Question Mark Department. If you have answers or have a question of your own which you would like answered, please address the Forum Editor, THE IRON AGE, 239 West 39th Street, New York.

Origin of Nitralloy

How did the term Nitralloy come into general use?

A. B. R.

THE word Nitralloy was coined by my wife and me at the time I controlled Chrome Alloy Products, Inc., Conshohocken, Pa. The name was at that time applied to nitric acid resistant chrome iron castings. When the Ludlum Steel Co. introduced the "Fry" nitriding process to America, which called for the use of chrome aluminum steels, they were in search of a name for these special nitriding steels, and as their consultant I suggested they use the word Nitralloy, which seemed to me very apropos, and which I still believe well applies to these particular steels or the further development of them.

T. Holland Nelson, Consulting Metallurgist, Philadelphia.

Smoking on the Job

We have always allowed our machinists to smoke whenever they desire, but recently I have noticed that much time is lost in this connection, also that the borrowing of cigarettes affords an excuse for one operator to visit another. I would like to know the experience of some others in this connection.

R. A. N.

A GOOD many plants have overcome this difficulty by prohibiting smoking altogether. This often is done from a fire hazard standpoint. The Rolls Royce plant at Springfield, Mass., adopted the English custom of a recess in the middle of the afternoon and permitted smoking only at that time. This is reported as a very successful plan. Other plants have 5-min. relaxation periods at the end of each hour, at which time operators are allowed to smoke.

F. E. C.

Method of Grinding

We are finishing small wire rope sheaves on automatics and feel that it might give us a better finish and be equally economical to finish these by grinding. Can you suggest some machine or operations? Quantities range from 50 to 100 of a size. The holes are not accurate. We chuck the pieces from the rim and face off the hub and bore the center holes. Tolerances are liberal. Material is mild cast steel and the finish is desired on the hub, the bore, the rope groove and on one outside surface of the groove.

H. P. A.

WE believe that two grinding wheels would be required for this work, a roughing wheel and a finishing wheel. These could be set on the same spindle side by side and by shifting the work the piece could be finished with one mounting in a jig or on an arbor. By arranging special jigs or arbors and using additional wheels, five or six pieces could be finished at one time.

H. G. W.

THIS matter has been studied and does not seem to lend itself to any of our standard machines. If it can be handled by a grinding machine to good advantage we would suggest using a machine similar to the Bryant chucking grinding machine.

H. T. W.

Packing for Nitriding

Should forgings be packed for nitriding?

D. F. C.

ALL parts, including forgings, should be packed for nitriding in order to insure satisfactory results. Experience has shown that with the proper use of packing materials a more uniform case is obtained, as well as a decided increase in the depth of case during the same time cycle. Packing the parts, furthermore, minimizes the possibility of hydrogen embrittlement. Magnesia and copper are the most effective packing materials, magnesia being most commonly used for relatively small parts in small containers, while copper is employed for large work in large containers. The magnesia should be finely divided, through 200 mesh being typical. Copper filings, turnings or fine chips may be used. When copper packing is employed, better results are obtained if the ammonia is dried by passing it through a suitable liquid such as glycerine or ethylene glycol. Occasional tests run on individual forgings may show a satisfactory case without the use of packing materials, but for extensive nitriding operations the packing of all parts is recommended for the optimum results.

T. C. F.

Trade Commission Condemns "Chicago Appraisal Plan"

Machine Tool Dealers Enjoined from Using Method Adopted in
1928 of Bidding on Used Machinery

WASHINGTON, Nov. 15.—The Federal Trade Commission has condemned the "Chicago Appraisal Plan" operated by the machine tool distributors of the Chicago district. A "cease and desist" order of the commission was announced last week and forbids the adoption of the plan or "of any other plan whereby members suppress or restrict competition between and among themselves in bidding for or appraising used machinery offered in trade as part payment for new machinery."

Members of the organization, formed late in 1928, do business in six Middle Western States. They deal in machine tools. According to the commission, approximately 85 per cent of the total volume of business in new machine tools transacted in the Chicago district is done by members of the association.

Under the Chicago Appraisal Plan the member distributors register with a central office or exchange with each other their firm bids or appraisals on used machinery which has been offered to them as part payment for new machinery. The member making the first or the highest appraisal or bid accepted or purchased the used machinery. The commission said that the member paid cash regardless of whether or not the bidder made a sale of new machinery to the customer offering the used machinery as part payment.

Commission Says Plan Eliminates Competitive Bidding

It was charged by the commission that the plan was adopted "with the purpose and object of eliminating competitive bidding by its members, and to limit the amounts allowed by them for used machinery."

Under the plan the central office was established as a clearing house for all information concerning trade deals among members of the association when used machinery was accepted as part payment for new machinery.

Although all members had agreed to observe the Chicago Appraisal Plan in their dealings with customers, the commission said, "as a matter of actual practice only the larger members operated under the plan, due to the fact that dealers in new machinery generally prefer not to accept used machinery as part payment for new machinery."

The commission declared that since the plan was put into effect Oct. 1,

1928, more than 1000 transactions have been reported to the central office by members. The aggregate value of used machinery involved in these transactions is given as approximately \$250,000.

The territory affected by the Chicago Appraisal Plan follows:

Illinois: All north of and including the counties of Pike, Scott, Morgan, Sangamon, Christian, Shelby, Coles and Edgar.

Indiana: All north of and including the counties of Benton, White, Carroll, Cass, Miami, Wabash, Noble and DeKalb.

Iowa: The entire State.

Wisconsin: East of and including the counties of Ashland, Price, Rusk, Chippewa, Dunn and Pepin.

Michigan: West of and including the counties of Branch, Calhoun, Eaton, Clinton, Gratiot, Isabella, Clare, Missaukee, Kalkaskia, Antrim, Charlevoix and Emmet, and the Upper Peninsula.

Nebraska: East of and including the counties of Dakota, Thurston, Cuming, Colfax, Platte, Nance, Howard, Sherman, Buffalo, Phelps and Harlan.

The executive committee of the association is composed of the following members, elected by its board of directors from the association membership: J. R. Porter, Marshall & Huschart Machinery Co., chairman; N. A. Booz, Federal Machinery Sales Co., secretary; E. P. Essley, E. L. Essley Machinery Co., treasurer; E. H. Wachs, Wachs-Gregg Co., and P. E. Rice, Hendey Machine Co.

Chicago Dealers Had Denied That Competition Was Restricted

Members of the organization in replying on Jan. 19, 1931, to the complaint of the commission denied that the Chicago Appraisal Plan restricted competition. It was pointed out that the market for second-hand equipment throughout the country is huge and is not affected by the plan. Not only was it denied that the plan worked discrimination against non-members, but, on the contrary, it was declared that the sales market for new machine tools was enlarged by the plan. It was stated that concerns which refused to accept trade-ins at all or limited them solely to used equipment of their own manufacture were enabled to inquire through the central office whether an appraisal or firm offer for the second-hand equipment of their customer had been registered. If so, it was pointed out, these concerns could agree to give the customer the same price if their new machine was purchased. By this method, it was urged, the manufacturers were as-

sured that they could dispose of a used machine and thus not deviate from their established policy of not handling trade-ins.

Prior to adoption of the Chicago plan, it was said, the one who made the best bid for the second-hand equipment was in a better position to get the sale of the new machinery, while under the plan all received the benefit of the bid and the customer was given a wider choice of the equipment he wanted to buy.

The answer dealt at length with other charges also. It denied that the plan in any way involved boycotting or blacklisting of customers or dealers, bonuses or refraining from competition, limitation as to the kind of machinery sold, territory or price maintenance. Answering charges as to the alleged influence of the central office, the machine tool makers said it exerted no control whatsoever over them, made no recommendations or suggestions and had no power or authority other than to receive and disseminate information within defined limits.

Scaling of Forgings Due to Sulphur

AN interesting paper at the session on drop forging at the October convention of the American Society for Steel Treating in Buffalo, dealt with the "Behavior of Steel in Sulphur-Containing Atmospheres at Forging Temperatures." The author was D. W. Murphy, University of Michigan, Ann Arbor, Mich. The investigation involved the solution of the problem of the effect of high sulphur in the coal or other fuels in heating furnaces.

One important finding of the author was that the use of high-sulphur fuels, containing 1 to 2 per cent sulphur, in forging furnaces, is likely to increase scaling losses and result in poorer forgings by reason of sulphur introduced into the outer layers of the steel. Hence the sulphur content of fuels for use in forging furnaces should never exceed 0.50 per cent, and should preferably be kept well below this figure. When high-sulphur fuels are used, said the author, operations should be conducted under reducing conditions to prevent high sulphur in the outer layers of the steel.

Commenting on this paper, O. W. McMullan, Timken-Detroit Axle Co., Detroit, said that the author shows that, after removal of surface in the flash and cleaning by pickling or sandblast, the effects of such an atmosphere would not be injurious in many cases. Any machining would be certain to eliminate the surface defects. It is possible, however, that flanges or axle I-beams and other thin sections would be sufficiently attacked to make starting points for fatigue failure. Scaling loss is, of course, a disadvantage in all cases.

The Mounting National Debt— America's False Complacency

By DR. LIONEL D. EDIE

THE national interest-bearing debt was \$25,234,496,274 on June 30, 1919. It shrank to \$15,921,892,350 in 1930 and today stands at about \$20,800,000,000.

The fact that, in spite of increases in the past two years, the debt is still \$4,400,000,000 below the peak, is pointed to by certain observers with the assurance that there is nothing to worry about. Indeed the argument is heard that we now face an emergency as great as war and that we can, therefore, without harm again pile up the national debt at least to the war-time peak.

This complacency arises from a superficial glance at a few simple figures. The mounting national debt is, in fact, a menace to confidence, a barrier to recovery and a threat to solvency. Responsible leadership should awaken to the situation and take action within six months.

The National Debt Versus Other Public Debt

When our national debt after the war stood at the twenty-five billion dollar level, State and local debt was only about \$7,000,000,000. Today, State and local debt exceeds \$17,000,000,000.

The remarkable rise of ten billions in State and local debt is additional burden upon the taxpayer. States and cities are staggering under the burden, in many cases on the verge of bankruptcy. This burden did not exist in 1919; it does exist now.

The American people have contracted public debt with the wanton recklessness of children. To saddle themselves with war-time levels of national debt on top of a \$10,000,000,000 increase in State and local debt, would be a primrose path to fiscal suicide.

The War Debt Part of the National Debt

Before, when the national debt was at its zenith, America took it for granted that a large part of that debt would be liquidated by payments to the United States on account of war debts owed by Europe. In 1920, the war debts owed to this country were \$10,338,058,352. At the end of 1931, these war debts were larger, not smaller, and amounted to about \$11,600,000,000. The increase is due

mainly to accumulated unpaid interest.

Today, no one but the unsophisticated really expects these war debts to be paid in full or even in large part. They will be shifted to the American taxpayer.

When we did not know this, when we light-heartedly assumed that Europe would pay us enough to liquidate one-third to one-half our national debt, we could be unconcerned about the astronomical figures involved.

But that illusion has gone. The war debt portion of our national debt does not wash out. We pay it. Those who view with equanimity our mounting national debt should take this consideration into the reckoning.

The Effective Burden of the Public Debt

The nominal debt should be contrasted with the effective burden. The latter is profoundly influenced by a major change in the price level.

When the national debt was at peak figures, the price level was 50 per cent higher than it is today. One dollar of debt today is as heavy a burden as one and one-third dollars ten years ago.

The effective burden of a national debt now of \$20,000,000,000 is as great as a debt of \$30,000,000,000 would have been ten years ago.

If we add together national, State and local debt, we have the result:

All public debt 10 years ago,	about \$31,000,000,000
All public debt in 1932,	about \$38,000,000,000

The increase thus shown is the nominal increase. The effective burden requires adjustment for the price level. The present public debt is equivalent to about \$57,000,000,000 in terms of the old price level.

This is not mere arithmetical juggling. It is a way of measuring the burden of debt on the taxpayer.

To put it another way: When the price level was high, the public debt was 31 billions, but now, with a price level one-third lower, it is 38 billions. Care-free additions to the national debt now, excused on the ground that the debt used to be higher, take on a new light when these basic facts are understood.

The effective burden of the total public debt, national, State and local,

today is nearly twice what it was a decade ago. This does not take into account the dawning realization that the war debts come out of our pockets. If further allowance be made for this factor, the effective burden today is nearly three times what it was assumed to be formerly.

Public Holdings of United States Securities

On Dec. 31, 1921, the public (i.e. outside of the banks) held about \$20,000,000,000 of the securities of the Federal Government, or about 84 per cent of the total.

At present, the public holds only about \$11,400,000,000 of the securities of the Federal Government, or about 55 per cent of the total.

Of recent new issues of Government securities, the public has absorbed a relatively very small proportion, probably less than one-third. The banks are financing the deficit.

The Banks Loaded with Government Securities

On Dec. 31, 1921, all member banks of the Federal Reserve System owned \$2,647,703,000 of United States Government securities; today, about \$6,000,000,000.

Formerly, United States Government securities were only 11 per cent of their loans and investments; today, more than 20 per cent.

This concentration in banks is particularly noticeable in New York City member banks. Their holdings of Governments now amount to about 36 per cent of their loans and investments.

The English Joint Stock banks do not report Governments separately from other investments, but if investments of all kinds are taken together, these English institutions show all investments as only 23 per cent of total loans and investments. If we assume that half their investments are Governments, their holdings of such securities would be only about 12 per cent of total loans and investments. Our similar ratio is 36 per cent for New York City banks. Relatively our New York banks are three times as heavily in Governments as the English banks.

The English preserve some of the traditions of commercial banking; our banks are rapidly becoming fixed
(Concluded on Page 775)

Policies of New Administration Of Great Interest to Business

Industrial Leaders Expected to Aid in Cooperation Promised by
President Hoover in Solving Problems

By L. W. MOFFETT

WASHINGTON, Nov. 15.—Swept into office on a tidal wave of discontent, the Democratic party will have strong control of the Government after March 4. Headed by President-elect Franklin D. Roosevelt, it will have a power of administration and legislation such as it did not have even in the first term of President Wilson, the only other Democratic President of the current century. Quite naturally business is manifesting anxiety as to what will be done with this power. That is always true in a change of government and especially of party dominance. The election itself perhaps brought a degree of steadying influence, for it marked the end of disturbances that characterize a political campaign.

Nevertheless, uncertainty as to what lies ahead is a factor that business is reckoning with. The reaction of the business world generally to the election of Mr. Roosevelt and the Democratic party has been favorable. While the turnover in the political situation perhaps does not reflect the sentiment of business as a whole, the fact remains that many business leaders have manifested a purpose to proceed with cooperation like that which President Hoover himself has offered to President-elect Roosevelt. Just as his long career of constructive work in the world at large for society and business has been a source of inspiration, so the splendid spirit of Mr. Hoover in the moment of a crushing defeat has been a matter of stimulation. In itself it offers an example that business evidently is anxious to emulate. If it can follow through, it is determined to do so.

Cooperation in Recovery Effort

It is also true that President-elect Roosevelt since election has indicated an earnest desire for cooperation in an effort to restore prosperity. There can be no doubt that Governor Roosevelt, through his own experience in public life, is thoroughly aware that President Hoover was the object of harsh criticism for conditions which neither he nor any set of men could possibly control. Hard times brought to Mr. Hoover an avalanche of attacks that, as unjust as they were, reached bitter proportions. Had they been taken at their face, the impression would have been given that he was wellnigh friendless and entirely without a vestige of influence. No President of the United States has

escaped unjust criticism and none ever will.

The election returns, however, overwhelming as they were as to the vote in the electoral college, really reflected a remarkable tribute to the popularity of Mr. Hoover. It is true that he has a vast influence left and will still have, even if the public is unfortunate enough to lose his services through retirement to private life.

This influence will have to be considered by Mr. Roosevelt, for it comes from the people generally. Nor is it doubted that Mr. Roosevelt will heed it. Taking upon himself responsibilities that perhaps exceed those of any other man in the world—certainly as great—Mr. Roosevelt may be expected not to turn to radical measures such as his opponents have represented he might do. His career in public life is not one of radicalism. The fact remains that business is anxious to know what Mr. Roosevelt will do.

Confusion as to Tariff Policies

His campaign remarks on what he termed the "Grundy tariff," a political myth if ever there was one, has left a great deal of confusion. The impression has been given that, following Democratic precedent, the tariff will be slashed sharply. Each of the two preceding Democratic Presidents since the Civil War, Grover Cleveland and Woodrow Wilson, brought about downward revisions. Whether, as Mr. Wilson said of the widespread letdown in industry upon enactment of the Underwood-Simmons law, it was due to a "state of mind," the fact remains the effect of the legislation was disastrous.

The Democratic platform provides for "a competitive tariff for revenue," whatever that may mean. If the interpretation placed upon it by President Hoover is correct, it means American industry must face the impossible competition with goods produced not only by low-paid labor, but in many countries with depreciated currencies. Then, also, Mr. Roosevelt has talked of supporting the idea of bargaining tariffs, a complete departure from American tariff policy. They were proposed in a bill passed at the last session. Generally this measure was looked upon simply as a political gesture, not to be taken seriously. It was well known it would be vetoed, as it was, when it reached the White House. It received much

publicity and was capitalized by means of foreign and domestic propaganda which obviously seeks tearing down of the American tariff system that so frequently is bitterly assailed in superior tones by alleged economists. Mr. Roosevelt's advocacy of tariff bargaining and his perhaps undue confidence in "Yankee shrewdness" to take care of itself in such bargaining has created considerable apprehension. Industry is suffering greatly, despite efforts at belittlement by selfish and other interests, from imports of a wide range coming from low-wage countries, some of them with currencies that continue to depreciate.

Many Democrats Are High Protectionists

But in the face of Mr. Roosevelt's appeals on the tariff issue he has said he would not decrease the agricultural rates, which, incidentally, represent about 60 per cent of the protection in the "Grundy" act. This would leave an area of 40 per cent for tariff slashes and tariff bargaining. Many Democrats are interested in tariff protection on industrial items, a factor that probably will narrow the slashes further. Republicans have said that a Republican high protectionist is relatively a timid soul when measured against a Democratic protectionist, whose number they say is increasing with the growth of industrialization in Democratic strongholds. A shining example pointed out is the tax, which in effect is a tariff duty, on imported crude oil, a protection no Republican tariff act ever carried.

Mr. Roosevelt therefore may face difficulties in trying to cut the tariff too much, though it is hazardous to predict he will not be able to do it. His bargaining tariff policy also is a misty matter yet to be developed. As proposed, it certainly exceeds any reciprocal tariffs ever suggested previously by Republicans. The overweening laudation given Mr. Roosevelt by the foreign press for his supposed tariff policy and the hoped-for policy of debt cancellation or reduction, etc., probably will not help the cause of advocates of these policies. It is not possible to imagine that Mr. Roosevelt is so guileless as to be cajoled into moves that would throw the American market open to a flood of foreign goods or that he is going to permit the loading of American taxpayers with added burdens by yielding to European and some domestic lectures on the necessity of cancelling the debts. He has promised sharp reduction in Government costs.

Sound Money Believed to Be Assured

There is general confidence that Mr. Roosevelt will not yield to the urge in some Democratic quarters, as indicated by the Goldsborough bill, to the issuance of fiat money. Mr. Roosevelt, again like his two immediate Democratic predecessors, assuredly has shown himself to be a stickler for the gold standard.

OFF THE ASSEMBLY LINE



Motor Car Makers Expand Operations; Plymouth Boosts Its Schedule

DETROIT, Nov. 14.

ALTHOUGH there has been little fresh buying of steel the past week, the automobile industry has taken further steps toward the production of new models on a volume basis, and assemblies this month should exceed by a comfortable margin the estimated 50,270 units of October. Chevrolet and Plymouth still occupy the center of attention because of their ambitious programs for the remainder of the year, but other companies, notably Dodge, Buick, Pontiac, Studebaker and Willys-Overland, are assuming increasing prominence.

Improved Chevrolet to Be Announced Next Month

Chevrolet's manufacturing plants are proceeding on a program of 60,000 cars in November and December, with assembly plants scheduled to start soon. The new Chevrolet will have a longer wheelbase, extensive body changes resulting in more pronounced stream lining and smarter appearance, and a lower price which "takes account of today's incomes." One of its mechanical improvements will be a newly-designed rear axle of revolutionary character. At least for the present Chevrolet has abandoned its so-called "stripped" model which was to have been called the Mercury. Experiments were carried on in connection with this small car last spring and it is said that the company went so far as to make some body dies, which later were scrapped. In recent weeks further work was done on the car, but it is now definitely known that the only car to be placed on the market in the near future is the improved Chevrolet, which will be announced next month.

It should be added that the industry's larger manufacturers are not entirely convinced that the motorist, even though his pocketbook is badly deflated, will take kindly to a car designed to meet the bare needs of

Plymouth has increased its November schedule from 20,000 to 25,000 cars.

* * *

Chevrolet has abandoned plans for manufacture of a "stripped" car.

* * *

General Motors' retail sales since March 1 have exceeded production by 74,059 cars.

▼ ▼ ▼

transportation. Two companies attempted to market such a car last spring in the form of "thrifty" models, and the results were anything but happy. Despite programs to the contrary on the part of some makers, a large portion of the industry is of the opinion that any attempt to cheapen cars through the use of less sturdy material or by reducing substantially their size will meet with failure. This is one of the reasons why General Motors is going slow in developing the Mercury and may decide to abandon it altogether. Its final decision probably will depend largely on what Ford will do in the early part of 1933.

Pontiac Production Retarded

Production of the new Pontiac has been somewhat retarded by delays in getting bodies from Fisher. The front and rear axles, transmission, springs, bumper, crankshaft and camshaft are being made at the Chevrolet factories in Detroit, while the cylinder blocks are being cast at Chevrolet's Saginaw foundry. This is one of the economies brought about by the consolidation of Chevrolet and Pontiac manufacture under W. S. Knudsen. After last-minute hold-ups due to body changes, Buick is now launched on its 1933 program at Flint. However, its revised schedule calls for only 7000 cars the rest of this year, compared

with an original figure of 10,000. Oldsmobile and Cadillac are still idle and probably will not start volume production until next month.

Plymouth Output Stepped Up

Plymouth has stepped up its November run from 20,000 to 25,000 cars. The Chrysler foundry is operating with day and night shifts turning out Plymouth cylinder blocks and other parts, while a number of departments at the Dodge plant making Plymouth parts are on a full six-day week basis. The new Plymouth, of 107-in. wheelbase, has valve tappets of two-piece construction, a steel stem being welded to a chilled cast iron base. Counterweights are forged integrally with the crankshaft, thus reducing bearing loads. Steel-back, interchangeable bearings of the precision type are used. To overcome the destructive heat of the exhaust flame, special exhaust valve seats of a tungsten-chrome alloy have been inserted in the cylinder block. In addition to the rigid X frame, secondary frame channels extend forward to the front spring horns to form a box-section frame, giving a weight reduction of 13 per cent and an increase in resistance to twists of 36 per cent. Helical, constant-mesh gears provide second gear operation and, in conjunction with a simple sliding gear, easy shifting is obtained without the aid of synchronizing cones or other devices. The free wheeling unit, of the cam and roller type, is housed in the transmission case. All exposed sheet metal parts are rust-proofed by being Bonderized.

Other Makers' Activities

Studebaker is understood to have cut down its originally planned program on its new lines for the remainder of the year. Nash is tooling up for its 1933 models, while the Willys foundry at Pontiac, Mich., Willys-Overland subsidiary, is getting under

(Concluded on Advertising Page 16)

PERSONALS

C. E. STEPHENS, formerly commercial vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, with headquarters in New York, has been elected a vice-president of the company and will retain his former headquarters. N. G. SYMONDS, who has been commercial vice-president at Chicago, has been made vice-president in charge of sales, as announced in these columns on Nov. 3, and will take up his headquarters at the general offices of the company in East Pittsburgh, reporting directly to J. S. TRITLE, vice-president and general manager.

Mr. Stephens is a native of Texas and attended the Ferris Institute in that State. He joined the Westinghouse organization in 1900. Following varied experience in the engineering department, he was transferred to sales and has served most recently as New York district manager, Eastern district manager and commercial vice-president.

Mr. Symonds, although a native of Ossining, N. Y., attended schools in California and was graduated from Leland Stanford University in 1901. He became associated with the Westinghouse Church Kerr Co. in 1902, and later served in the stoker department of the Westinghouse Machine Co. at Chicago. When the machine company was absorbed by the present company in 1915 he continued at Chicago as manager of the power division, and three years later became manager of the industrial division. He was Chicago district manager of the company for nine years prior to 1930 when he became a commercial vice-president.

JOHN H. ROMANN, for the past seven years general superintendent of the Ewald Iron Co., Louisville, Ky., has been appointed general manager. He was formerly identified with the Illinois Steel Co. and the American Steel Foundries and later was technical adviser in Europe for Joseph T. Ryerson & Son, Inc.

GEORGE M. SHARER, who has been connected with the Philadelphia office of the Link-Belt Co. in various capacities for the past 32 years, has been made sales manager of the company's Eastern division, with headquarters in Philadelphia.

P. F. McDONALD, president of the P. F. McDonald Steel Co., Boston, sailed on Nov. 11 for a three months' business trip through England, Germany, France, Belgium and Sweden.

IRWIN F. HOLLAND, superintendent of the small tools division of the Pratt & Whitney Co., Hartford, Conn., is to speak on "Machining Difficulties in Alloy Steels" at a meeting of the New

Haven chapter of the American Society for Steel Treating, Nov. 17, at the Chase Companies' Auditorium, Watertbury.

GEN. OTTO H. FALK, chairman of the board of directors, Allis-Chalmers Mfg. Co., Milwaukee, is serving as vice-chairman of the Committee on Industrial Rehabilitation for the Wisconsin area.

FRED H. DORNER, Milwaukee manufacturers' representative, and vice-president, American Society of Mechanical Engineers, has been appointed a member of the Board of Visitors, University of Wisconsin, Madison, to fill a vacancy, to represent the alumni.

E. J. BERRY, general superintendent, Chicago works, Link-Belt Co., was the principal speaker before the time and motion study section, Milwaukee Society of Industrial Engineers, on Nov. 9.

DR. IRVING LANGMUIR, associate director of the General Electric Research Laboratory, has been awarded the Nobel prize in chemistry for 1932. Among his achievements is the development of the atomic hydrogen arc-welding process.

OBITUARY

ELMER E. STONE, who until his retirement in September, 1931, was a director of the American Steel & Wire Co. and also general purchasing agent for the company, with headquarters at Cleveland, died suddenly on Nov. 12. He was born at Hockingport, Ohio, in 1861 and first entered the business world with the Pennsylvania Railroad. For several years he was a clerk attending to purchases for the Brad-dock Wire Co. He went to Chicago as general purchasing agent for the American Steel & Wire Co. upon its formation in 1898.

MALCOLM E. GRAY, founder and former president of the Rochester Can Co., Rochester, N. Y., died at the Genesee Hospital after a long illness on Nov. 7, aged 65 years. He was born at Harriston, Ont., and learned the tinsmith trade in Kalamazoo, Mich. In 1899 he went to Rochester as an employee of the Rochester Stamping Co. and later founded the can company. He is said to have been among the first to put into operation the five-day week plan. At the time of his death Mr. Gray was chairman of the board of the Rochester Can Co.

EDGAR A. SCHEIBE, purchasing agent of the Bausch & Lomb Optical Co., Rochester, died suddenly in that city on Nov. 7, aged 52 years. He en-

tered the employ of the optical company as an errand boy some 35 years ago. Shortly after he became identified with the purchasing department and soon was made its head. Mr. Scheibe was a member of the education committee of the National Purchasing Agents Association and had devoted much attention to developing procedure and educational plans for purchasing departments.

MORRIS KNOWLES, president of the consulting engineering firm of Morris Knowles, Inc., Pittsburgh, died suddenly at his home in that city on Nov. 8, aged 63 years. He was born at Lawrence, Mass., was graduated from the Massachusetts Institute of Technology, Cambridge, Mass., and located in Pittsburgh in 1897. At the time of his death he was a director in the Pittsburgh Aviation Industries Corp., and a partner in the Knowles-Main Appraisal Bureau.

LEWIS H. JONES, for many years president of the Detroit Copper & Brass Rolling Mills, Detroit, died at his home in that city on Nov. 1. Recently he had devoted his time to duties as director of several corporations and to his private interests.

THOMAS A. MUSGROVE, for many years sales representative in the Detroit territory of Geuder, Paeschke & Frey Co., Milwaukee, died suddenly on Oct. 31 of a heart attack at his home in Highland Park, Mich. He had been associated with the company for 47 years.

ALEXANDER S. MITCHELL, who for a number of years was New York district sales agent of the former Eastern Steel Co., Pottsville, Pa., died on Nov. 7 at his home at Pawling, N. Y., at the age of 72. Mr. Mitchell retired from business in 1922.

WILLIAM C. SMITH, president of the Atlas Iron Works, St. Louis, died there on Nov. 12 after an illness of several months. He had been engaged in the structural steel fabricating trade for more than 40 years. He first became identified with the old Christopher & Simpson Iron Works, where he worked up to the position of general superintendent. He left them 12 years ago to head the Atlas concern. Mr. Smith was 63 years old.

A. R. PURDY, president of the A. R. Purdy Co., New York, steel jobber, died at his home at Rutherford, N. J., on Oct. 8, aged 50 years. He had been in the jobbing business since 1902.

J. SCOTT BUTTON, in charge of the architectural engineering service bureau of the General Electric Co., died of pneumonia at Schenectady on Nov. 3. He had been identified with the company since 1896.

R. F. C. Openly Declares Policy in Favor of American Materials

WASHINGTON, Nov. 15.—Chairman Pomerene of the Reconstruction Finance Corporation last week announced that the organization had adopted a resolution requiring that domestic materials be used in self-liquidating projects for which it lends money. This was formal acknowledgment of reports that such a requirement is made in connection with loans. It has been previously published in THE IRON AGE that the Reconstruction Finance Corporation had adopted the policy.

The Finance Corporation is disregarding protests of city officials and New York realty interests against the loan of \$3,957,000 made last week to the Hillside Housing Corporation. The latter contemplates the construction in the Bronx of a complete neighborhood unit of low-rent apartments to house 1513 families.

The Reconstruction Finance Corporation is understood to take the posi-

tion that protests should be filed with the New York State Housing Board. It is said that a number of protests had been presented to the New York board, but that the Reconstruction Finance Corporation gave them no official recognition so far as making a loan is concerned.

Purchase of \$175,000 worth of steel and other materials will be made by the Twin Lakes Reservoir & Canal Co., Olney Spring, Colo., for the construction of a canal and tunnel project. The Reconstruction Finance Corporation has granted a loan of \$1,125,000 with which to finance the work. The canal and tunnel will be built for diverting water from the west slope of the Rocky Mountains, taken under the Continental Divide and used to increase the capacity of the Twin Lakes reservoir from 54,400 to 70,000-acre feet. The tunnel will be partially lined, 3.8 miles long and 9 ft. in diameter.

Railroads Propose Rate Cuts To Meet Waterway Competition

WASHINGTON, Nov. 15.—Iron and steel products, ferroalloys and machinery are included in a wide range of commodities on which railroads propose reduced rates to meet inland waterway competition. Petitioning the Interstate Commerce Commission, the carriers have asked for so-called fourth section relief so as to establish lower rates on long hauls between ports on the Mississippi, Ohio, Illinois and Warrior Rivers and Gulf ports now served by the Inland Waterways Corporation and the Mississippi Valley Barge line, and other water movements. It is proposed to cut the rates to a level of 25 per cent over the prevailing all-water rates. The all-rail rates suggested express conversely the same relationship as the barge line rates of 80 per cent of the all-rail rates originally fixed by the Federal Railroad Administration upon inauguration of water service.

On iron and steel products between New Orleans and Cincinnati, to cite a typical example, the all-water rate is 42c. per 100 lb., the 80 per cent rail rate would become 43c. and the all-rail rate would become 53c.

The Interstate Commerce Commission has set Nov. 30 as the date for a hearing at the Coronado Hotel in St. Louis before Examiner Fuller regard-

ing the proposal of railroads to establish reduced proportional rates on iron and steel products in carloads. The originating points are Atlanta, Ga., Birmingham, Ala., Knoxville, Tenn., and other Alabama, Georgia and Tennessee origins and the destination is New Orleans. Schedules filed also propose reduced rates from New Orleans and Baton Rouge, La., to Beaumont, Galveston, Houston and other Texas and intermediate points.

The following rates, stated in cents per 100 lb., are illustrative:

	Proposed	Present
From Birmingham to New Orleans	26	34
From New Orleans to Houston	20	51
From Birmingham to Houston	46	70

*New Orleans combination.

Philadelphia Steel Club Elects New Officers

PHILADELPHIA, Nov. 15.—The Steel Club of Philadelphia yesterday elected officers as follows: President, W. O. Lange, Phoenix Iron Co.; vice-president, F. L. Stephenson, Bethlehem Steel Corp.; secretary-treasurer, Arthur Butterbaugh, Sharon Steel Hoop Co.; board of directors, Messrs. Lange,

Stephenson and Butterbaugh, Stuart Hazelwood, Midvale Co., and Arthur L. Meyer, Alan Wood Steel Co.

Tribute to the memory of the late Thomas W. Simpers was paid by the club through Thomas C. Ham, the retiring president. Mr. Ham's remarks were incorporated in a letter of sympathy which the club directed to Mrs. Simpers and family.

Unfilled Steel Orders Gain For Third Month

Unfilled orders of the United States Steel Corp., as of Oct. 31, showed a gain of 11,950 tons, the third consecutive monthly increase. The September gain was 15,495 tons and that of August was 3293 tons. The total of unfilled orders at the end of last month was 1,997,040 tons.

Unfilled orders at the end of each month since 1929 follow:

	1932 Tons	1931 Tons	1930 Tons
January	2,648,150	4,132,351	4,468,710
February	2,545,629	3,965,194	4,479,748
March	2,472,413	3,995,330	4,571,653
April	2,326,926	3,897,729	4,354,220
May	2,177,162	3,620,452	4,059,227
June	2,034,768	3,479,323	3,968,064
July	1,966,302	3,407,816	4,022,055
August	1,969,595	3,169,457	3,580,204
September	1,985,090	3,144,833	3,424,338
October	1,997,040	3,119,432	3,481,763
November	2,933,891	3,639,636
December	2,735,353	3,243,596

The Mounting National Debt

(Concluded from Page 771)

trusts holding Government securities. There is a limit.

Economy in national expenditures is becoming a live issue. The Treasury's estimated ordinary expenditures for the fiscal year ending June 30, 1933, are \$3,647,623,000. Of this, \$1,136,000,000, or nearly one-third, is service on the national debt. This sum is relatively fixed. Very little if any cut can be made in this third.

When the floating debt, already in the neighborhood of \$6,000,000,000, is funded, and there is urgent need for funding, the rate of interest will be higher on long-term bonds than on the present short-terms and a sinking fund will have to be set up. This will add upward of 200 millions to ordinary expenditures, and at a time when economy is the need of the hour.

The national debt is not an inexhaustible fountain of spending-money. Complacency about the mounting national debt is shortsighted. The time has come to stop Government borrowing, to stop justifying further borrowing by all kinds of specious excuses. The era of Federal borrowing to meet all kinds of social exigencies is over.

... LETTERS TO THE EDITOR ...

Efficient Operation of Large Blast Furnaces

Editor, *The Iron Age*:

In discussing the fuel economy of large blast furnaces in the Aug. 18 issue of *THE IRON AGE*, page 254, Roy P. Hudson suggests pounds of coke burned per cubic foot of bosh volume as a basis for comparing the driving rates of blast furnaces. The justification given for using the volume of the bosh rather than hearth area is that, as pointed out by J. E. Johnson, combustion occurs throughout the bosh and is not confined to a plane at the tuyere level.

Numerous gas samples have been removed from the tuyeres and from several feet above the tuyeres of blast furnaces by various investigators (Wedding's *Handbuch der Eisenhüttenkunde*, 1906, 3, 203-241), beginning with Bunsen in 1843 on down to the more extensive and recent investigations conducted by Perrott and Kinney (Combustion of Coke in the Blast-Furnace Hearth: *Trans.*, A. I. M. M. E., vol. 69, 1923, pages 543-584), for the Bureau of Mines. Since it has been established that combustion is confined to localized zones extending about 40 in. beyond the nose of the tuyeres, space rates of combustion should be confined to these rather small zones. Coke is burned more rapidly per unit volume of combustion space in large furnaces.

Since the total volume of the furnace from the stock line to the tuyeres is intended to be utilized in the process, the rule of the Southern Ohio Pig Iron and Coke Association, which assumes that the capacity of the furnace should be approximately proportional to its total working volume, appears to be a fair method for comparing the capacities of blast furnaces using comparable raw materials.

The smaller heat losses per ton of iron in the 1000-ton furnace, as compared with a 500-ton furnace, have, as Mr. Hudson points out, been offset by other conditions which influence fuel economy. If the larger furnace produces a smaller tonnage per cubic foot of working volume than the smaller furnace and requires as much fuel per ton of iron, it appears that the volume of the large furnace available for heat transfer, reduction, and other important functions is not utilized with as high a degree of efficiency. This implies greater non-uniformity in gas distribution and rate of stock descent in various parts of the large furnace.

Except for radical changes in the shape of the furnace, there appears to be no way of correcting the tendency for the stock to move faster along the periphery in comparison to the

rate of travel in the central part as the hearth diameter is increased. Much of the non-uniformity in gas distribution is due to size segregation at the stock line. Size segregation is affected by methods of charging, but is due primarily to the large disparity in the particle size of ore and coke. In the case of fine ores and concentrates, agglomeration is the most positive and effective way of diminishing size segregation at the stock line and of establishing more uniform gas distribution.

In addition to curtailing dust losses, coarsening the burden has the added advantage of facilitating the use of higher blast temperatures.

Improvements in the size preparation of iron ores, which implies the agglomeration of fines and the judicious crushing and sizing of coarse ores, would permit more efficient utilization of the volume available for smelting in large furnaces.

T. L. Joseph,

Supervising Engineer,
North Central Experiment Station,
United States Bureau of Mines,
Minneapolis, Minn.

Alloy Indicators and Corrosion Problems

Editor, *The Iron Age*:

I noticed in your issue of Sept. 29 a comment on my article ("Alloy Indicators" Suggested for Solving Corrosion Problems," *THE IRON AGE*, Sept. 1) by H. G. Keshian, Chase Brass & Copper Co., Waterbury, Conn., and through the medium of your columns I should like to take this opportunity of replying to the various points raised by Mr. Keshian.

Mr. Keshian suggests that this simple procedure of using "indicators" is often followed. I think, however, that he has misconstrued the basic principles of the thought. Many manufacturers of corrosion-resistant alloys are in the habit of submitting samples of their materials for test under certain corrosive solutions. This policy, however, differs materially from the one suggested in my article.

I intended to convey very clearly that all corrosion-resistant alloys more or less came within four groups and that by the use of indicators typical of these four groups it was possible to indicate which particular group of alloys was most suitable for handling unknown solutions. Having used these four group indicators, which are nothing more or less than materials typical of (1) an iron-chromium group, (2) an iron-nickel group, (3) an iron-chrome-nickel group, and (4) an iron-nickel-chrome group, it then

becomes easier and more economical to pursue a study of the particular group indicated rather than to spasmodically continue a series of haphazard tests with a variety of materials.

I note with interest that Mr. Keshian comments on the fact that indicators are not always reliable, due to the fact that physical conditions can and do in many places play an important part, and Mr. Keshian cites instances that have come before his particular notice. These points I readily concede. For instance, cold-drawn material will probably not behave exactly like the same material in the annealed condition; a piece of material distorted at one point will, under certain conditions, react with the adjacent material of the same composition which is free from distortion. These factors, however, are becoming better understood as time goes along and at least they are within the realm of the fabricator rather than strictly in the realm of the chemist and metallurgist.

It would be asking rather too much of any set of indicators to expect, in addition to foreshadowing a suitable composition, to lay down also the methods by which it shall be fabricated and the final physical condition in which it must exist to give the best service. I do, however, feel that the use of Midvaloy Indicators is a distinct step forward in classifying materials, eliminating a lot of unnecessary and expensive testing and at least establishing basic principles upon which one may approach complex problems with more confidence and knowledge than has been possible in the past.

I should like to thank Mr. Keshian for his timely comment, which is greatly appreciated.

T. HOLLAND NELSON

A. O. Smith Corp., Milwaukee, is making delivery of two cracking stills, the largest it has ever constructed, to a refining interest in the Southwest. The high pressure vessels are built of 3½-in. plates, each being 65 ft. long, with a 10-ft. inside diameter, and weighing 250 tons each. They constitute one of the heaviest rail shipments ever made from Milwaukee and require the largest gondola cars in the United States, especially constructed by the Milwaukee Road for transportation of such units.

The first increase in more than a year in the Milwaukee employment index is noted in the September report of W. J. Fairbairn, secretary, Milwaukee branch, National Metal Trades Association. With 45 shops reporting, the total number of employees in September stood at 8522, an increase of 72 over August. Average number of hours worked per man per week also showed a slight increase, moving up from 29.4 in August to 30.7 in September.

• • EDITORIAL COMMENT • •

Common Sense and Imports

IT has commenced to dawn on Americans that Uncle Sam is not the rich uncle of the world to whom all depressed countries can look for relief from their troubles. Uncle Sam has more than his own share of troubles, more than his own share of prostrate industries and unemployed millions. He has all he can do to fight his own economic battles.

It is to be hoped, therefore, that practical common sense will replace maudlin sentiment and fine-spun theoretical considerations in his attitude toward the problem of imports. More than a year ago Great Britain went off the gold standard and other countries soon followed suit. This depreciation of currency largely reduced the effectiveness of our import duties, exposing our industries to ruinous competition. Those European countries which clung to the gold standard reduced their export prices in keeping with the depreciation of the English pound sterling. In fact, they did more than that; they lowered steel prices enough to overcome both the currency disadvantage and the duty of 33 1/3 per cent which the British imposed during the current year.

Imports of both British and Continental steel into this country have become alarming both from the standpoint of price and volume. While the total tonnage of European steel entering this country has declined during the course of the depression, that is not the significant point. What concerns American manufacturers is that the volume of imports has declined less than American production. Moreover, the adverse effects of imports are multiplied many times in terms of unemployment, depriving men of work not alone in the steel works, but in the iron and coal mines, on the Great Lakes and on the railroads. It is no exaggeration to say that the movement to curb imports is now primarily motivated by a desire to curb unemployment. And the struggle of our mills to provide work for their men is no "welfare" gesture. It is the most serious problem of the industry today. Either jobs must be provided or the company's treasury must be drawn on to give food, clothing and shelter to idle workmen and their dependents. With deficits piling up, it is apparent that there are limits to the amount of relief work that American mills can do.

The time has come when emergency action must be taken to curb foreign undermining of employment in our steel mills. We need quicker relief than is possible under existing laws. Under the present anti-dumping statute charges of dumping have been filed against European countries. An investigation is under way and no one can say how soon a determination will finally be made as to whether the domestic selling prices of those countries have been really higher than export prices to the United States. But even if technical dumping, as defined by our statute, is not proved, it will not alter the fact that American mills are subjected to unfair competition. A recent report from abroad indicates that steel bars are

being quoted in Belgium at 65.2c. per 100 lb. This compares with the ruling American price of \$1.60, Pittsburgh. It is apparent, therefore, that Belgian steel is either being sold at less than the cost of production or that Belgian wages are at pauper levels. Surely steel made by pauper workmen should rightfully be classed as dumped material, regardless of whether or not it is technically such under the present anti-dumping act.

Other countries believe in protecting their own industries. They are not handicapped by cumbersome administrative machinery. Control of import duties in most countries is an executive function. Duties are changed at will, as conditions dictate. At times embargoes are placed on certain commodities, or quotas are so restricted as to make it next to impossible for imports to enter.

Our Northern neighbor, Canada, furnishes an excellent example of a realistic, effective and prompt treatment of the problems growing out of currency depreciation in Great Britain and the world competitive situation it brought about. On Oct. 24, 1931, barely more than a month after the pound sterling went off the gold standard, the Canadian Department of National Revenue issued an order in council which arbitrarily fixed the par value of the pound at \$4.40 for dump duty purposes. It was provided that the dump duty should be the difference between that figure and the average exchange value of the pound as declared by the department twice a month. To illustrate, the average value of the pound sterling, as determined for duty purposes by the department for the period Nov. 16 to Nov. 30, 1932, is \$3.71. This means that British goods entering Canada, whether on the free list or not, will pay a special dump duty of 69c. per pound sterling. Only goods of a kind and class not made in Canada are exempt. In addition to the dumping duty, the Canadian Government levies regular tariff duties against British products on the basis of the pound sterling's former gold exchange value of \$4.86 2/3.

With reference to countries still on the gold standard but which are quoting unusually low prices, Canada has adopted an equally effective policy. It does not concern itself with determining domestic selling prices or manufacturing costs in the country of origin. It fixes by executive order what it regards as a fair value for the product and assesses a dumping duty for the difference between that value and the price of the imported material.

Canada has not as great a stake in its steel industry as this country. The measures it has adopted commend themselves to our coming Congress. It is futile for our legislators to increase tax levies, as they undoubtedly will, if they take no steps to protect the industries that must pay the taxes. Two crying needs of American industry must be satisfied—first, a statute that will provide duties to offset currency depreciation; secondly, legislation that will provide effective protection against pauper-produced imports.

Industrial Rehabilitation Work Lists \$70,875,000 To Be Spent

Committee Headed by A. W. Robertson Issues First Report of
Equipment Buying Now Scheduled

MORE than \$70,875,000 will be expended for new machinery, equipment and plant facilities and for general remodeling and modernization undertakings by companies which have thus far reported to the Committee on Industrial Rehabilitation, of which A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co., is chairman.

Mr. Robertson has made public a list of manufacturing companies and other business organizations that have responded to the committee's program for industrial modernization launched late in August.

Chairman Robertson said that he makes the first modernization listings public following the end of a contact tour in the course of which he, with Malcolm Muir, a member at large of the national committee and president of the McGraw-Hill Publishing Co., jointly presented the committee plan to large groups of executives in important business centers. Meetings have been held to hear the committee program in Cleveland, Pittsburgh, Chicago, St. Louis, Milwaukee, Detroit, Boston, Baltimore and Philadelphia. The total attendance at these meetings is estimated at 5000.

Every Large Company Urged to Join in Movement

The American Telephone & Telegraph Co., with a modernization program involving expenditure of \$35,000,000, and the Standard Oil Co. of New Jersey, committed to an outlay of \$20,000,000 for improvements, head the list of companies. The chairman stated that the rehabilitation proposals are being placed before the executives of every large industrial organization in the United States.

Other large modernization programs included in the list are those of the Pacific Gas & Electric Co., which will spend \$5,000,000 in the next 12 months for improvements and expansion; the Great Southern Lumber Co., to spend \$1,250,000 for improvements; Westinghouse Electric & Mfg. Co., which is committed to an outlay of \$1,260,000; Bogalusa Paper Co., Bogalusa, La., \$1,500,000; National Steel Corp., \$900,000; Allis-Chalmers Mfg. Co., \$200,000; Pittsburgh Plate Glass Co., \$350,000; Continental Oil Co., \$780,000, which may be increased to \$1,500,000 before the end of the year, according to reports made to the national committee.

Included also in Chairman Robert-

son's list are the Montana Power Co., which will expend \$100,000 for a new absorption plant and refinery; the Homestake Mining Co., constructing a new cyanide metallurgical plant at Lead, S. D., at a cost of \$250,000; Newport Rolling Mill Co., \$200,000; Crosley Radio Corp., \$500,000; U. S. Playing Card Co., \$200,000, and Continental Can Co., \$150,000.

The Pittsburgh industrial area, which is included in the committee organization for the Fourth Federal Reserve district, reports so far modernization undertakings in business and industry to cost \$2,693,100. This sum will be expended by 16 companies, these including Pittsburgh Plate Glass, National Steel and Westinghouse. The sub-committee on industrial rehabilitation for the Cincinnati industrial area, reports modernization commitments of \$1,651,000 by 15 companies to date. These companies include U. S. Playing Card, Newport Rolling Mills, Crosley Radio and Continental Can organizations.

Modernization programs reported so far for the Ninth or Minneapolis Federal Reserve district include the Montana Power and Homestake Mining operations and reach a total of \$515,000 to date. Included also are expenditures of \$30,000 by the Dayton Co., Minneapolis, for recently completed remodeling and modernization of its department store and of \$25,000 by Boutell Brothers in Minneapolis to improve their furniture and household goods establishment. In St. Paul, Montgomery Ward & Co. will spend \$45,000 for plant improvements.

The modernization expenditures noted for the Pacific Gas & Electric Co. are included in a list of projects reported to the Committee on Industrial Rehabilitation for the Twelfth or San Francisco Federal Reserve district. In that area, rehabilitation operations include \$150,000 for completion of modernization work in the plants of the Columbia steel division of the United States Steel Products Co.; \$200,000 for additional new facilities and industrial extensions for Gladding, McBean & Co. in its California plants; new plant in South San Francisco for the American Brake Shoe & Foundry Co., to cost \$50,000 to \$75,000; new plants at Oakland and San Jose, Cal., for the Continental Can Co., to cost \$130,000; and a plant in Oakland for the El Dorado Oil Works, to cost between \$300,000 and \$400,000.

In addition to these, the national committee reports that the Standard Oil Co. has authorization for the immediate purchase of \$3,000,000 in material and equipment, which purchases normally would be spread over next year. The Paraffine Companies, Inc., have authorization for a new plant at Emeryville, Cal., to cost \$52,000, and a chemical company, for the present withholding its name, has authorized resumption of its modernization program at a total cost of \$150,000.

Preliminary Figures Only "Scratch the Surface"

"Expenditures noted in this report," said Chairman Robertson, "are for operations ranging all the way from the construction of new plants and the installation of new machinery, equipment and plant facilities to the improvement and remodeling of retail business establishments.

"These first totals only scratch the surface and do not include literally thousands of small modernization undertakings which have been reported by telephone and by mail to committees in all of the Federal Reserve districts. Working on the basis that manufacturers who have the advantage of available cash or liberal credit facilities should be approached first, the committees in the 12 Federal Reserve districts and in the industrial areas within their boundaries are visiting these manufacturers and urging them to survey their plants from the standpoint of their modernization needs. The movement is strengthened, and its opportunities for success increased, by general agreement among committee chairmen and workers to 'take their own medicine' and look into their own plants for rehabilitation opportunities. The response to this phase of the job has been most encouraging.

"Expenditures for modernization of industrial plants and of retail places of business strike at the heart of the unemployment problem, since they affect favorably the present plight of 1,620,000 unemployed workers in plants devoted to the manufacture of machinery, equipment and plant and store facilities covering a wide range of need and usefulness. The movement appeals, of course, to the self-interest of the manufacturer and the merchant alike, urging them to modernize now, at a time when equipment is low in cost and when changes may be made with a minimum of disturbance to production or operation. Such modernization, according to the conception of the national committee program, places both manufacturer and merchant in a more favorable position to meet sales competition when good times return in full force."

The twentieth annual meeting of the National Foreign Trade Council is to be held in Pittsburgh, April 26 to 28. Gardner L. Harding is secretary.

SUMMARY OF THE WEEK'S BUSINESS

Automobile Industry Chief Support of Steel as Other Buying Declines

Miscellaneous Orders in Smaller Volume—Railroad Tonnage Slow to Come Out—Ingot Production This Week at 19 Per Cent

NEW business in steel products has continued to decline in nearly all markets except Cleveland, where automotive requirements are paramount. A policy of caution among buyers, which began to affect orders adversely during the latter half of October, has not been altered even with the election uncertainty out of the way. On the contrary, the placing of some tonnage under consideration before the election has been indefinitely postponed.

To what extent the apathy of steel buyers is due to political uncertainty and how much to natural year-end tendencies toward restriction of stocks is difficult to determine. Among jobbers there is a definite indication that pre-inventory considerations are affecting purchases, but steel stocks in the hands of manufacturing consumers are so small that mills are constantly being urged to hurry shipments, and hence any further check upon manufacturers' orders, if general business continue to improve, will have a favorable reaction later on.

THE automobile industry is the one major steel-consuming channel that is pushing ahead with some degree of aggressiveness, but even here marked activity is largely confined to a few companies, notably Chevrolet and Plymouth. However, other makers, including Buick, Dodge, Pontiac, Studebaker and Willys-Overland, are also busier. Plymouth has stepped up production to 1200 cars a day, and some departments are working seven days a week. November production of the industry should exceed the estimated 50,270 units of October by a fairly good margin. Automobile accessory manufacturers are placing orders more freely for strip steel. A Philadelphia body builder has received large contracts for car bodies.

Railroads are slow to enter steel orders. Only one new rail contract has been placed, 3000 tons for the Delaware & Hudson. The Erie, which will need approximately the tonnage taken this year, will not buy until the end of the year. No other tonnages are definitely in sight. The New York Central steel purchases for car and locomotive repairs probably will be small, as material from dismantled cars will be salvaged and used again.

In the construction field there is the usual year-end letdown, notwithstanding the efforts of the Washington Administration to push building work for aid of the unemployed. Structural steel lettings in the week were only 8500 tons, a small total even though it was more than double that of the preceding week.

Bids were taken this week on 11,000 tons for a post office in Cleveland.

Miscellaneous seasonal business, which helped to lift steel production moderately in September and October, is in smaller volume.

The 1933 tin plate price probably will be announced this week. A reduction is expected, but the mere ending of the uncertainty as to the price will undoubtedly release a number of large tin plate contracts, on which mills will be able to roll for shipment in January and February.

STEEL ingot production for the country as a whole has slipped slightly this week to 19 per cent. Output in some districts has declined, while in others there has been a gain. Cleveland output is up three points to 38 per cent of ingot capacity, the Wheeling district is operating at 40 per cent, mostly on anticipatory tin plate rollings, and the Buffalo mills are doing better. However, Birmingham production has dropped to 10 per cent, declines of smaller proportions have occurred at Chicago and in the Youngstown area, while the Pittsburgh mills are barely holding their recent average of 17 per cent.

The decline in steel-making activity at Chicago has affected heavy melting steel scrap, the minimum price of which is 25c. a ton lower, bringing THE IRON AGE scrap composite down to \$7.46. Nearly all grades have declined at Detroit, an important scrap producing center, while at Pittsburgh there is a tendency toward weakness, though absence of transactions leaves prices unchanged.

Pig iron and finished steel quotations are generally steady. Current prices of sheet steel probably will be continued into the first quarter. Leading makers of structural shapes have adopted a new plan of quoting wherein prices will be named for delivery at the job, including fabrication-in-transit rates where such apply. The effect of this may be to localize structural steel fabrication. Following recent reductions on rails and tie plates, a downward revision of \$4 a net ton has been put into effect on angle bars.

CONTINENTAL European steel mills are booking more business, especially from South America and China, and they have good inquiries from Scandinavia and Holland. Some Luxemburg mills are sold up to the middle of January. Continental steel prices continue to rise.

▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Nov. 15, 1932	Nov. 7, 1932	Oct. 18, 1932	Nov. 17, 1931
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$13.59	\$13.59	\$13.84	\$15.51
No. 2, Valley furnace.....	14.50	14.50	14.50	16.00
No. 2 Southern, Cin'tl.....	13.82	13.82	13.82	14.69
No. 2, Birmingham.....	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*.....	15.50	15.50	15.50	17.00
Basic, del'd eastern Pa.....	13.50	13.50	13.50	16.25
Basic, Valley furnace.....	13.50	13.50	13.50	15.00
Valley Bessemer, del'd P'gh..	16.89	16.89	16.89	18.26
Malleable, Chicago.....	15.50	15.50	15.50	17.00
Malleable, Valley.....	14.50	14.50	14.50	16.50
L. S. charcoal, Chicago.....	23.17	23.17	23.17	25.04
Ferromanganese, seab'd car- lots	68.00	68.00	68.00	85.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$40.00	\$40.00	\$43.00	\$43.00
Light rails at mill.....	30.00	30.00	32.00	34.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	29.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	29.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	29.00
Forging billets, Pittsburgh...	31.00	31.00	33.00	35.00
Wire rods, Pittsburgh.....	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, gyrd. steel, P'gh, lb....	1.60	1.60	1.60	1.60

Finished Steel

<i>Per Lb. to Large Buyers:</i>				
Bars, Pittsburgh.....	1.60	1.60	1.60	1.60
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.65
Bars, New York.....	1.95	1.95	1.95	1.93
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.60
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.898	1.898	1.898	1.88
Structural shapes, P'gh.....	1.60	1.60	1.60	1.60
Structural shapes, Chicago...	1.70	1.70	1.70	1.70
Structural shapes, New York...	1.86775	1.86775	1.86775	1.85 1/4
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.10
Hot-rolled strips, Pittsburgh..	1.45	1.45	1.45	1.50
Cold-rolled strips, Pittsburgh.	2.00	2.00	1.90	2.05

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel

	Nov. 15, 1932	Nov. 7, 1932	Oct. 18, 1932	Nov. 17, 1931
<i>Per Lb. to Large Buyers:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.10	2.10	2.20	2.40
Hot-rolled annealed sheets, No. 24, Chicago dist. mill...	2.20	2.20	2.30	2.50
Sheets, galv., No. 24, P'gh...	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	3.00
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.70
Hot-rolled sheets, No. 10, Chi- cago dist. mill.....	1.65	1.65	1.65	1.80
Wire nails, Pittsburgh.....	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh.....	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill.	2.25	2.25	2.25	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh..	\$4.75	\$4.75	\$4.75	\$4.75

Old Material

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh...	\$9.25	\$9.25	\$9.50	\$10.25
Heavy melting steel, Phila...	7.25	7.25	7.25	8.00
Heavy melting steel, Ch'go...	5.87 1/2	6.00	6.00	8.00
Carwheels, Chicago.....	7.00	7.00	7.00	8.50
Carwheels, Philadelphia.....	9.25	9.25	9.50	11.50
No. 1 cast, Pittsburgh.....	9.50	9.50	10.00	10.00
No. 1 cast, Philadelphia.....	9.25	9.25	9.50	10.50
No. 1 cast, Ch'go (net ton)...	6.25	6.25	6.25	8.50
No. 1 RR. wrot., Phila.....	7.50	7.50	7.50	9.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	6.50

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.40
Foundry coke, prompt.....	2.75	2.75	2.75	3.50

Metals

<i>Per Lb. to Large Buyers:</i>				
Lake copper, New York.....	5.50	5.25	6.25	7.37 1/2
Electrolytic copper, refinery..	5.25	5.00	6.00	6.75
Tin (Straits), New York.....	24.65	23.65	24.30	23.25
Zinc, East St. Louis.....	3.15	3.00	3.05	3.30
Zinc, New York.....	3.52	3.37	3.42	3.65
Lead, St. Louis.....	3.00	2.90	2.90	3.90
Lead, New York.....	3.15	3.00	3.00	4.05
Antimony (Asiatic), N. Y....	5.87 1/2	5.87 1/2	5.62 1/2	6.75

▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

Finished Steel

Nov. 15, 1932	1.948c. a Lb.
One week ago	1.948c.
One month ago	1.977c.
One year ago	2.008c.
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products make 85 per cent of the United States output.	
	High Low
1932	1.977c., Oct. 4; 1.926c., Feb. 2
1931	2.037c., Jan. 13; 1.945c., Dec. 29
1930	2.273c., Jan. 7; 2.018c., Dec. 9
1929	2.317c., April 2; 2.273c., Oct. 29
1928	2.286c., Dec. 11; 2.217c., July 17
1927	2.402c., Jan. 4; 2.212c., Nov. 1

Pig Iron

					\$13.59 a Gross Ton
					13.59
					13.59
					14.96
Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.					
HIGH			LOW		
\$14.81,	Jan. 5;		\$13.59,	Oct. 25	
15.90,	Jan. 6;		14.79,	Dec. 15	
18.21,	Jan. 7;		15.90,	Dec. 16	
18.71,	May 14;		18.21,	Dec. 17	
18.59,	Nov. 27;		17.04,	July 24	
19.71,	Jan. 4;		17.54,	Nov. 1	

Steel Scrap

\$7.46 a Gross Ton	
7.50	
7.58	
8.75	
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.	
High	Low
\$8.50, Jan. 12;	\$6.42, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22

Pittsburgh Steel Production Is Barely Holding at 17 Per Cent

PITTSBURGH, Nov. 15.—Although orders for finished steel have not declined perceptibly in the last week, structural steel orders are lighter and tonnage from the railroads is slow to reach mills. The trend of automotive releases is still upward, but gains have been very limited, and Pittsburgh district mills have not shared heavily in flat rolled tonnage placed recently from this source. Orders for hot-rolled and cold-rolled bars have been somewhat heavier, and demand for strip steel is improving. Movement of hot-rolled annealed and galvanized sheets is lighter, but is offset by heavier shipments of full finished material in the industry as a whole.

Output of tin plate is barely holding its recent rate and is maintained almost entirely by anticipated tonnage. Announcement of the 1933 price this week will probably see additional releases for winter rolling.

Wire products are very quiet, and demand for pipe seems to be declining. Offsetting this to some extent is a moderate revival in inquiry for line pipe. Although one order for gasoline-carrying material may be placed immediately, the prospect for other lines is still rather vague.

Steel ingot production in the Pittsburgh district is barely holding its own at about 17 per cent of capacity. The local plants of the leading interest are not engaged at more than 15 per cent, one large independent is running at about 19, and the smaller units are engaged at from 16 to 18 per cent. Blast furnace production is holding its own.

The local rail mill ran for scarcely a week, and its requirements brought little change to the aggregate needs for raw steel in the district. Mills in the Valleys and adjacent northern Ohio cities are running at 15 per cent this week, although heavier automotive orders may boost the rate in the next few days. Production in the Wheeling territory averages at least 40 per cent of capacity, as one plant turning out raw steel for tin plate production is engaged at a near-capacity rate. Independent plants in that district are running at a much better rate than the industry as a whole.

Finished steel prices are generally holding, although certain grades of sheets going to the automobile group are notably weaker. Few deviations from the 1.60c. price on bars, plates

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Finished steel orders have not declined perceptibly, but expected business is slow to reach the mills.

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Ingot output in Pittsburgh district holds at 17 per cent, but Valley production is slightly lower.

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Scrap market drifting with tendency toward weak side.

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and shapes are reported. The leading maker of structural steel has adopted a revised method of quotation on fabricating jobs.

Pig Iron

Shipments this month are falling behind those of October if movement of basic iron to a steel-making plant in the district is excepted. Water delivery of iron against this order, which was placed a few weeks ago, is being carried on by several of the producers which shared in the business. Carload lots make up the bulk of foundry requirements, but prices are holding fairly well on small orders. A pipe maker in Ohio is reported to be negotiating for a fairly large tonnage of foundry iron.

Warehouse Business

Sales of steel products out of warehouse have declined slightly in the last week or two, but are in much heavier volume than they were in July and August. The rather steady price structure is helping the situation, particularly on heavy hot-rolled products and nails and wire. The only recent change has been on spikes, which are now quoted at \$2.40 per 100 lb.

Ferroalloys

Speigeleisen prices have been reduced \$1 a ton to \$24, f.o.b. furnace, on the 19 to 21 per cent grade. Ferromanganese continues at \$68 a ton, and other ferroalloys are unchanged. Movement is very light.

Semi-Finished Steel

Shipments this month are not varying much from the rate which prevailed in October, and prices continue rather firm. Billets, slabs and sheet bars are quoted at \$26, Pittsburgh or Youngstown, and forging billets com-

mand the usual \$5 a ton differential. Wire rods are unchanged at \$37, Pittsburgh or Cleveland.

Rails and Track Accessories

Inquiry for rails is still lacking in the Eastern market, and the local mill completed a brief run last week on its accumulated specifications. Releases on track material are light, although some new buying is in prospect.

Bars, Plates and Shapes

The market continues dull, and last week was one of the quietest of the season so far as structural steel and reinforcing bar awards are concerned. Public works projects predominate, but even these have been rather small, and aggregate business booked is not encouraging. State highway work is going forward very steadily because of recent favorable weather, and sizeable lettings are scheduled in both Pennsylvania and Ohio for the latter half of this month. Miscellaneous railroad purchases are still a feature of the plate market, but no outstanding tonnage has been booked recently. The New York Central is expected to place steel required for its recent car repair program before the end of this month. Bars are moving to the automobile industry in slightly better volume, but miscellaneous demand from manufacturers is light.

Prices remain unchanged at 1.60c., Pittsburgh, for bars, plates and shapes. Makers of structural steel are inaugurating a new system of quoting prices which calls for a delivered price on the material worked out on the basis of fabrication-in-transit rates.

Tubular Goods

The Pure Oil Co., which is now understood to be the prospective buyer of the gasoline line from Toledo to Detroit mentioned recently, has not yet placed the material, and delay may postpone the purchase until next spring. The line calls for 4000 to 5000 tons of 6-in. pipe. Demand for tubular goods in general continues very dull, and seasonal movement of standard pipe has largely ceased. There is little demand for oil country goods, and ample stocks at Memphis and in the fields point to little further activity this winter.

Wire Products

Jobbers still decline to build up inventories and are buying only for immediate requirements. Manufacturers' wire is doing little better than

the merchant products, but the price is well maintained at 2.20c., Pittsburgh. Nails are also comparatively firm in this district at 1.95c. a lb., Pittsburgh.

Sheets

Sheet makers in this territory have not had enough business from the automobile industry in the last week or two to make much of a difference in their production schedules, but some tonnage has been placed in Detroit and Cleveland. Buying has been entirely for new models, but most of the automobile companies are watching their output closely and making few forward commitments for steel. Demand for sheets from other sources is off slightly, particularly in the case of galvanized material. Production of both black and galvanized sheets was lighter in the industry as a whole last week, but the decline was offset by an improvement in full finishing schedules, and the industry is still running at a little over 20 per cent of capacity. Prices are holding at recent levels on most products, although light cold-rolled sheets and long ternes are being shaded rather frequently.

Tin Plate

The industry is marking time pending announcement of the 1933 price, which is expected this week. A reduction is in prospect, but opinions differ as to the amount. Mills are still running at slightly less than 45 per cent of capacity, although producers which are busy on anticipated tonnage are doing even better.

Strip Steel

The month's tonnage to date has compared favorably with that of October because of the heavier taking of the automobile industry. Demand from other sources is barely holding its own. The industry is running at about 20 per cent of capacity, and prices are holding at 1.45c., Pittsburgh, on hot-rolled strip, and 2c., Pittsburgh or Cleveland, on cold-rolled.

Coke and Coal

Heating coal and coke have been moving more freely in the last week because of colder weather. Demand for the foundry grade is also holding up, but furnace coke continues very dull. Prices are weak on practically all grades of this material.

Scrap

With no sales of importance reported, the scrap market is drifting uncertainly, although the tendency seems to be toward weakness. Recent quotations are unchanged in view of the lack of buying, but dealers are having less difficulty covering old orders, and substantial mill purchases might possibly lower the market. Consumers are generally uninterested in further buying just now, and the foundry grades are in no better demand than steel-making material.

St. Louis Stove Foundries Aided by Cold Weather

ST. LOUIS, Nov. 15.—Recent cold weather has given an added stimulus to the stove and heating appliance trade generally, which has been seasonally busy, and the melt is expected to show a further increase during the next few weeks. Some of the jobbing foundries also are reporting an increase in operations. Consumption of basic and malleable grades continues to be light. Generally, there is a better feeling in the trade. Prices are firm and unchanged.

Steel

Open-hearth operations in the district showed a slight improvement during the week, being at about 16 per cent of capacity. Highway projects continue the center of interest. The State of Texas will let \$10,000,000 worth of contracts between now and Jan. 1, and Indiana will take bids on 100 miles of paving on Nov. 22. Smaller lettings will be made by Illinois and Oklahoma also this month.

Scrap

Dealers in scrap have not been as willing to buy because several of the mills in the district that had been buying are out of the market. Rails for rolling, the demand for which is off, have been reduced 50c. a ton; otherwise the list is nominally unchanged. Railroad lists: Baltimore & Ohio, 5500 tons, including 3000 tons of carwheels; St. Louis Southwestern, 650 tons; Mobile & Ohio, 57 carloads; Missouri-Kansas-Texas, 34 carloads; St. Louis-San Francisco, 14 carloads of scrap rails, and Pullman Co. (St. Louis), 8 carloads.

New Localized Hardening Process Developed

A process for localized surface hardening, which renders articles so processed resistive to wear, has recently been developed and commercialized by the Mackintosh-Hemphill Co., Pittsburgh. The process has been given the proprietary name "Wearproof."

Wearproofing can be applied to many products which are subjected to extreme wear. They can be taken from stock or service and given this treatment. The hardness and toughness attained will be in proportion to the base properties of the metal in the articles themselves. The process, however, was developed primarily for treating Mackintosh-Hemphill's special alloy cast steel MacHempite, and it is in this application that the maximum degree of hardness and toughness is attained.

The Wearproof process, it is stated, introduces no stresses during the processing and none are present

thereafter. There is no distortion introduced requiring subsequent dressing to restore trueness. The penetration is under accurate control, and is never permitted to extend so deep as to remove the primitive strength and toughness of the base material. Hardness ranges from 60 to 90 sclerescope, and is regulated according to the service conditions to be withstood. Either cast or machined surfaces may be treated. Where accurate and silent operation is necessary, machined surfaces are naturally obligatory.

It is claimed that Wearproof gears and pinions and like articles will retain their original contour indefinitely, and that the strength and toughness, which come from the fact that the backbone of the metal is unaffected, eliminate any need of "humoring" the machine, with consequent lost production.

Meehanite Licensees Meet in Cleveland

The Meehanite Research Institute, consisting of foundries licensed under the Meehanite patents and devoted exclusively to the study of the metallurgy of Meehanite, held its annual meeting recently at Wade Park Manor in Cleveland. P. E. Rentschler, president Hamilton Foundry & Machine Co., Hamilton, Ohio, read a paper on the "Comparison of Hardness, Strength and Contraction of Meehanite Metal in Light Sections for Various Chill Values," and A. C. Denison, chairman of technical research, presented a survey of "Meehanite Gears" and another on "Heat Resistant Tests." F. R. Hoadley, vice-president, Farrel-Birmingham Co., Ansonia, Conn., discussed the weldability of Meehanite, while S. J. Standish, G. H. R. Foundry Co., Dayton, Ohio, described the use of Meehanite in brake drums and bearings. W. E. Illig, Banner Iron Works, St. Louis, told about the nitriding of Meehanite. L. B. Tuttle, Koehring Co., Milwaukee, discussed the sale of castings. Oliver Smalley, who has served as president of the institute for three years, was reelected.

New Jordan Automobile Company Organized

Jordan Motors, Inc., Cleveland, has been formed by former executives of the Jordan Motor Car Co. and plans to manufacture a straight-eight medium price automobile. John McArdle, vice-president and general manager and one of the receivers of the old Jordan company, is president; A. F. England, treasurer of the old company, is vice-president and treasurer, and Harvey Buchner, works manager of the former Jordan plant, is vice-president in charge of production.

Chicago Steel Business Declines; Ingot Output Also Lower

CHICAGO, Nov. 15.—Ingot output in this district has declined to a range of 16 to 17 per cent of capacity, a loss of about $1\frac{1}{2}$ points. Both new buying and specifications have dropped slightly under the average that prevailed near mid-October.

All along the line there is a strong inclination to limit commitments to a minimum and to watch closely developments both marketwise and from the political angle. This situation has resulted in postponement, and in some cases cancellation, of some tonnage that sellers had expected would be released this month.

The rail market is still dull, but fastenings are moving faster on small-lot rush orders that are for immediate use. Rail releases made several weeks ago against old contracts are still supporting a light production schedule at one mill. With the exception of some inquiry for cast iron, the scrap market is lifeless. The lowering of ingot production has adversely affected heavy melting steel shipments to mills, and prices are off 25c. a ton. A complication has arisen in this market over the refusal of local mills to accept automobile scrap because of its alloy content. The outcome of this controversy is as yet uncertain.

Pig Iron

Some fresh inquiry for Northern foundry iron is making its appearance and a few sales are recorded, some of them for extended delivery. The rate of shipment is still on a par with that of October, and there are some indications that improvement may be in store for this commodity. Output is limited to one furnace, which is operating at part capacity.

Bolts, Nuts and Rivets

Demand remains in the narrow channel which it has followed during the past few weeks. Specifications by jobbers are particularly light, one reason being the approach of the inventory period. Prices are steady.

Reinforcing Bars

Freezing weather has definitely put an end to road work in Illinois and bar shipments for this purpose are at an end. A sizable tonnage will be carried forward to 1933. In the absence of private work, mill shipments of reinforcing bars have fallen to the lowest point of the year. Prices are unchanged. Several dams on the Mississippi River and a water plant at

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Chicago district ingot output at about $16\frac{1}{2}$ per cent, a loss of $1\frac{1}{2}$ points.

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Buyers turn more cautious, influenced partly perhaps by prospective political developments.

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Some tonnage has been postponed and cancellations have occurred in a few instances.

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Heavy melting steel scrap declines.

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Wilmette, Ill., are among the few large jobs pending.

Rails and Track Supplies

Angle bars have been reduced to \$2.55, base, per 100 lb. Releases for track supplies have been measurably better in the last few days. The bulk of this tonnage is being applied against old commitments. New purchases are lagging. The rail market is dull except for a contemplated order from the St. Louis-Kansas City Short Line, which is trying to obtain a Federal loan. One rail mill remains in operation on releases received several weeks ago.

Sheets

Orders are small, the aggregate tonnage being lighter than at the turn of the month. Distribution by jobbers is light. Quantity buyers, as measured by present market conditions, are still exerting pressure against the price structure. This applies especially at automobile producing centers.

Cold-Rolled Strip

Moderate improvement in demand is coming from automobile manufacturers. The usual quotation is 2c. per lb., Cleveland, though a few weak spots have made their appearance. The industry is producing at 12 per cent of capacity.

Structural Material

Both new inquiries and awards are light, but a fair tonnage of bridge work is overhanging the market. Low bidders have been announced on several highway span jobs. The dam and

locks at Fountain City, Wis., will require about 1400 tons of steel rather than 700 tons, as previously reported.

Wire Products

Demand remains unchanged, with the loss in tonnage from country areas about offset by increased use by some automobile manufacturers. Low grain prices have had much to do with dwindling demand in the country and, with the season well advanced, there is little likelihood of betterment in that direction. Jobbers will soon take inventories and in the meantime will order little from mills. Their low stocks may lead to buying at the opening of the new year. Output is in the range from 25 to 30 per cent of capacity. Mill stocks are being allowed to shrink.

Plates

The Federal inquiry for 450 tons of plates for oil barges is the only business of size before the local trade. The oil industry remains very quiet. Somewhat larger tonnages are moving to railroad repair shops.

Bars

The only real support now coming to bar mills is from some automobile plants. Miscellaneous demand is less active. Some consider this a temporary condition. Farm implement plants have not expanded schedules, and it is said they may not do so until some time in December.

Cast Iron Pipe

Most awards are small with the exception of 3000 tons placed by Grand Island, Neb. Some orders are being rushed through because of the lateness of the season, but orders of this kind are light in comparison with those of previous years.

Scrap

Heavy melting steel is definitely weaker. Quotations range from \$5.75 to \$6 a gross ton, delivered consumers' yards. Ingot output has receded moderately, and steel scrap demand is lighter. On the other hand, inquiries for cast scrap have strengthened prices for that grade. Because of alloy content, local steel mills are refusing automobile scrap. The ultimate outcome of this controversy and the final outlet for this grade are in doubt at this time. A second cargo of heavy melting steel has moved from Chicago to Lake Erie, and there is still prospect that a third boat will leave a local dock.

Eastern Pennsylvania Trade Shows a Little Slackening

Some Encouragement Derived from Large Contract for Bodies Placed With Budd Plant

PHILADELPHIA, Nov. 15.—Business has shown a further slight slackening. At the same time the trade generally reflects greater cheerfulness. The tension of the election having passed, there is more determination to proceed and endeavor to develop the markets. Consumers also manifest an added degree of certainty and some have indicated that releases of pending business will be made soon for diversified products. There is still a restraint, however, which has to do with prospective legislation at the session of Congress beginning in December, as well as that which may be instituted under President Roosevelt, with an overwhelming Democratic majority in both branches of Congress.

The sheet and strip trade is encouraged over a large contract awarded to the Edward G. Budd Mfg. Co. by the Chrysler Automobile Co., one of the largest of the kind placed in the past three years. It is estimated to range as high as \$9,000,000. It is understood it provides mostly for the production of bodies for the Plymouth. The other awards are for bodies for the Chrysler and the Dodge. The Heintz Mfg. Co. is said to have received fair-sized awards for building bodies for the Hupp, Willys-Overland and Auburn.

One open-hearth furnace in this district was added to the active list the past week. Ingot output is now well established at 14 per cent of capacity.

Pig Iron

Orders are confined to 50 and 100-ton lots and are principally for foundry grades. Prices are unchanged.

Plates, Shapes and Bars

There has been a slight let-up in orders for the heavier lines. Small lots being booked come from diversified sources. No additional bookings for railroad work are reported.

Sheets

Orders placed with automobile body builders have given a tone of more cheerfulness to sheet and strip makers. While some steel is being awarded, no large lots are expected to be placed for the new models until late next month, when the program of construction will get well under way.

Warehouse

Jobbers report a dearth in demand. Prices are unchanged.

Imports

The following iron and steel imports were received here last week: 58 tons of structural shapes from France, 50 tons of iron ore from England, 17 tons of structural shapes, 6 tons of steel rounds and flats and 2 tons of steel bands from Belgium.

Scrap

The market is quiet. Temporarily, mills have ceased buying. Some consumers, however, have ordered light shipments on contracts.

Boston Pig Iron Prices Show Firmer Trend

BOSTON, Nov. 15.—Pig iron sales the past week were slightly more than 1000 tons. The Mystic Iron Works disposed of nearly 700 tons. Indications are the slight gain in business will be maintained this week as two or three fairly good tonnages are under consideration by melters. The price situation appears somewhat firmer owing to the exhaustion of stocks held by a New York State furnace and a tendency among Buffalo furnaces to stop price shading. Dutch iron, however, is still available at prices fully \$2 a ton under those on domestic iron.

The scrap market is virtually at a standstill. Prices are largely nominal. Some improvement in business is anticipated this week.

Birmingham Pig Iron and Steel Trade Slow

BIRMINGHAM, Nov. 15.—With the month half gone, November pig iron sales and shipments have failed to hold the upward trend of the preceding two months. Stove plant melt, the most important factor in September and early October, has declined, while the requirements of pipe plants, restricted and irregular, have shown no sustained change in recent months. The pipe plants are still hopeful of considerable tonnage, dependent on R. F. C. loans, before winter is over. Foundries show no inclination to change from what is largely a spot basis, ordering only for immediate melt and in many cases delaying until it is necessary to wire or telephone. The prices of \$11 for the Southern market and \$10 for com-

petitive territory continue unchanged. Five blast furnaces are active, no change having taken place since early October. This week the output of the Fairfield furnace of the Tennessee company may be stopped for a few days.

Steel

Bookings of the two local steel manufacturers last week were unusually low; it was one of the poorest of recent weeks. There has been a dwindling of demand for some time past. Important tonnages are lacking, and current buying is confined almost entirely to small orders. Last week five open-hearths were active. During most of the present week there will be only two. Very little activity is scheduled this week at the Fairfield works of the Tennessee company. All of the open-hearths are to be idle, blast furnace production will be stopped and there will be only limited activity at any finishing mill that might be operated.

Scrap

There is practically no interest or new business. The movement of contract tonnage is also negligible.

Pacific Coast Imports of Steel Show Decline

SAN FRANCISCO, Nov. 12.—Government figures show that the tonnage of imported steel, pig iron and cast iron products received at Pacific Coast ports has shrunk materially for the current year and especially in recent months.

For the three months of the third quarter, imports at Pacific Coast ports were as follows, in tons:

1932	July	Aug.	Sept.
Wire products.....	1,444	969	979
All other steel products.....	3,680	1,201	1,250
Pig iron and cast iron pipe.....	348	261	191

This compares with a monthly average for the two preceding years as follows, in tons:

	1931	1930
Wire products.....	1,206	970
All other steel products.....	6,452	8,269
Pig iron and cast iron pipe....	1,125	1,811

With election and armistice holidays, the past week has been one of the least active for the entire fall, and movement has been almost negligible. It is understood that it may be several months before the 11,000 tons of structural shapes and 6000 tons of reinforcing bars still to be placed on Golden Gate bridge contracts will be specified by contractors. The Federal Veterans Bureau has called for bids Dec. 20 on 11 buildings for a new diagnostic hospital at Fort Miley, San Francisco, estimated to cost \$1,500,000, which should require considerable tonnage of both bars and shapes, though dependable figures are not yet available. Bids will be opened Dec. 6 for a \$300,000 Forest Service Building at Ogden, Utah.

Cleveland Steel Orders Gain; Ingot Output Also Higher

Improvement Mainly Attributed to Automobile Industry
Though Some Miscellaneous Business Has Increased

CLEVELAND, Nov. 15.—Business in finished steel shows a moderate increase, recovering much of the loss that was caused by the lull that prevailed for two weeks before election. Ingot output in Cleveland has gained three points by the putting on of an additional open-hearth furnace by the Otis Steel Co. Local steel plants are now operating at 38 per cent of capacity, or the best since last May.

Recent releases from the motor car industry have permitted the better operations. Some new orders for bar products have been placed by automobile manufacturers in the Detroit territory and additional business in hot-rolled strip has come to Cleveland sales agencies from accessory manufacturers. Some of the local stamping plants are somewhat busier on automotive work, but business with forge shops continues quiet.

Activity in the structural field is holding up well, but it is still confined entirely to public work, mostly highway bridges and post offices. No new demand has come from railroads in this territory. However, the Erie Railroad is expected to make its rail purchases for 1933 before the end of the year and it is stated that this road's requirements will be fully as large as for the current year.

Finished steel prices are being well maintained on most products. Sheet manufacturers do not seem to feel that present conditions warrant attempts to advance prices for the first quarter and ruling quotations probably will be reaffirmed for that delivery. While cold-rolled strip is being maintained at 2c. for most buyers, concessions of \$2 a ton are being made to some preferred customers.

Pig Iron

The market continues dull, with sales limited to small lots for immediate needs and no inquiries of size are pending. Most consumers are covered for their early needs. Shipments so far this month have been about the same as during October. Prices for foundry and malleable grades are steady at \$15, Cleveland, for local delivery and \$14 to \$14.50 for outside shipment.

Sheets

Present sheet prices are expected to be reaffirmed for the first quarter, although official announcements have not yet been made. Little new demand came from the motor car industry

during the week and there was not much business from other sources. The local Fisher Body plant has now got under good production on Chevrolet bodies and has again become a large consumer. Some of the refrigerator manufacturers have increased operations, but carried over sheets from the third quarter during which their production was not up to expectations. Consequently, they are not yet making any purchases. A few of the stove manufacturers are operating better than recently. While the market lacks firmness, the recently quoted range in prices remains in effect.

Iron Ore

Ore stocks on Lake Erie docks Nov. 1 amounted to 5,223,086 tons, against 6,079,512 tons on the same date a year ago. Receipts at these docks in October were 614,077 tons and for the season 2,408,054 tons, against 14,299,149 tons up to Nov. 1 last year. Shipments in October were 461,655 tons and for the season to Nov. 1, 2,349,025 tons, compared with 10,699,626 tons during the same period last year. Receipts at other than Lake Erie ports in October were 220,245 tons and for the season to Nov. 1 were 768,078 tons, against 8,184,755 tons up to Nov. 1 last year.

Strip Steel

Additional orders for hot-rolled strip have come from some makers of accessories for General Motors and Chrysler automobiles. Demand from other sources is light. The market is firm at 1.45c., Pittsburgh. Cold-rolled strip is quiet. While most makers are now quoting this market at 2c., Cleveland, the 1.90c. price has not disappeared.

Scrap

With no new demand from local and Valley district consumers and very limited shipments, the market is virtually lifeless. However, some activity is looked for later in the month. One local mill continues to take steel-making scrap. Prices are unchanged, but untested.

Bars, Plates and Shapes

Several additional highway bridge projects in Ohio requiring 900 tons and including a bascule bridge for Port Clinton taking 500 tons are up for bids, and bids are being taken this week on three highway bridges in western Pennsylvania requiring 800 tons. Bids were opened in Washing-

ton today on the Cleveland post office, calling for 11,000 tons. Some business is reaching mills from fabricators recently awarded bridge work. Miscellaneous orders for bars show some gain. Plates are dull. Prices are firm.

Buffalo Steel Plant Operations Gain

BUFFALO, Nov. 15.—Pig iron inquiry in this district is very slack, and very little business is being placed. A blast furnace of the Republic Steel Corp., which had been on a slow schedule, has been advanced to full operation.

Steel

Open-hearth operation in this territory is better than it has been in some months. The Lackawanna plant of Bethlehem Steel is operating six open-hearths, with the prospect that these will continue for some time. Republic Steel started this week with three open-hearths which may continue through or may be dropped to two later in the week. Wickwire Spencer is operating one.

Scrap

Sales of No. 1 machinery cast, including one of 200 tons, are reported at around \$10. A stove plate consumer is expected to come into the market within the next week or so. There is no local market for No. 1 heavy melting steel, and forced shipments must go to Pittsburgh or Youngstown. Therefore the price is nominally lower here.

Cincinnati Pig Iron Sales Make Small Total

CINCINNATI, Nov. 15.—Pig iron demand the past week comprised less than 500 tons in single car orders. Shipments on old contracts have increased this month, and the trade feels that this is a tangible sign of better business feeling. The melt is still low. The peak of stove business appears to be past.

Steel

Election diverted steel users' attention from their needs the past week, causing demand to slacken. The steady demand previously, however, causes the trade to feel that the present easing in demand is only temporary. Future interest in substantial tonnage is lacking.

Scrap

A watchful waiting atmosphere pervades the scrap market. Dealers are expecting better business, although current orders are still small. Shipments against contracts are slow. Prices are unchanged.

New York Steel Business Continues Pre-Election Drop

Delaware & Hudson Buys 3000 Tons of Rails—New Method of Quoting Structural Shapes Adopted

NEW YORK, Nov. 15.—Steel business in the New York area has continued to decline, emphasizing the reactionary influences which set in a week or two prior to the election. The dullness of last July and August has been experienced in some sales offices. Whether the failure of business to recover with the election uncertainty out of the way is due to natural year-end tendencies toward restricted buying or is the result of hesitation because of the prospective change in administration does not yet appear to be clear.

The outstanding development of the week affecting steel is the announcement by makers of structural shapes of a new method of quoting for building construction requirements. Mills will hereafter avoid blanket coverage of fabricators and will insist on quoting prices on the plain material for each specific job. The fabricator, in asking for prices, must state the location of the job, and the quotation to the fabricator will not be a price f. o. b. mill or f. o. b. nearest basing point to his plant, but a delivered price at the job. This delivered price, instead of being merely the mill price plus the freight rate on a straight haul of the plain material, will be the price at nearest basing point plus the fabrication-in-transit rate from mill-to-fabricator-to-job. Thus, for New York City work the Bethlehem, Pa., base of 1.70c. per lb. would be used. The freight rate on plain material from Bethlehem to New York is 16.775c. per 100 lb., but if a New Jersey fabricator's fabrication-in-transit rate was, say, 18c. per 100 lb. the delivered price at New York would be 1.88c. It is believed that the effect of this change will be to localize the structural steel fabricating business to a large extent.

The Delaware & Hudson has ordered 3000 tons of rails from the Bethlehem Steel Co., the Texas Co. has placed an unstated tonnage of plates for tanks to be erected at Port Arthur, Tex., awards of 3000 tons of structural shapes and 500 tons of reinforcing bars for a viaduct in New Jersey are expected shortly, and the New York Central Railroad probably will buy about 1000 tons of steel for its repair program. These are the high spots in an otherwise dull market. Purchases of the New York Central for repairs probably will be small because of the use that will be made of material from old cars and locomotives that have been dismantled.

Pig Iron

Release from retarding influences of elections has not yet accelerated demand. Though scattered requests for rush shipment of small lots indicate that foundry stocks are barely sufficient to meet current needs, general character of demand still reflects buying hesitancy and offers no evidence of increased melting activity. Total bookings for the week dipped to about 1000 tons, compared with 3000

Stockholders Bring Suit Against Bethlehem Steel

A suit was filed in the Supreme Court of New York City on Tuesday against the officers and directors of the Bethlehem Steel Corp. by two stockholders, the Standard Investment Co. and Irma W. Jackson, charging that more than \$20,000,000 of the corporation's funds were used in the purchase of stock presumably for distribution among employees and officers.

The purchase is alleged to have been made between October and December, 1929, and was for the purpose, it is understood, of selling stock to the company's officers and employees pursuant to the company's stock subscription plan for employees. The plaintiffs ask that the amount of the loss through this stock purchase be determined by the court and assessed against the defendants.

Charles M. Schwab, chairman; Eugene G. Grace, president, and other officers and all of the directors are made defendants in the action.

Roots-Connersville-Wilbraham, Connersville, Ind., manufacturer of blowers and pumps, reports a substantial increase in volume of business during September. Orders booked were 43½ per cent greater than the total for July and 26½ per cent greater than the total for August. The volume of orders received during September was 32 per cent better than for the same month in 1931.

Patterson Foundry & Machine Co., East Liverpool, Ohio, will start the manufacture about Jan. 1 of a complete line of conditioned air heating systems, air conditioners, oil burners, domestic stokers and gas fired equipment for all types and sizes of heating loads.

tons in the previous week and 1500 tons two weeks ago. No. 2 plain foundry iron at Buffalo is being held at \$14, with a 50c. differential applying on malleable. Eastern Pennsylvania iron for delivery into this district is virtually nominal at \$13.50, furnace.

Spiegeleisen has been reduced \$1 a ton to \$24, furnace, for prompt shipment. On round-lot tonnages, however, concessions undoubtedly would prevail.

Scrap

A round tonnage of No. 2 heavy melting steel, which was sold last week for export to Germany, is being accumulated on barges at \$3 a ton. An inquiry for 5000 to 10,000 tons of miscellaneous scrap for delivery to Italy has failed thus far to arouse interest among local dealers because of the low price offered. Eastern mill requirements are still lagging. This list is nominally unchanged.

Trade News

Boiler Tubes.—Williams & Co., Inc., Pittsburgh. New price list covering knobbled charcoal iron, lap welded steel, and seamless steel boiler tubes; also copper ferrules, both plain and flanged.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has appointed E. J. von der Heide, 824 Miami Savings Building, Dayton, Ohio, as its sales representative to handle Farrel-Sykes gears, gear units and gear generators in the Midwest territory.

Midvale Co. and Midvale-Philadelphia Co., Philadelphia, have removed their San Francisco office to Nineteenth and Alabama Streets, and their San Francisco warehouse to 614 Alabama Street.

Roots-Connersville-Wilbraham, Connersville, Ind., manufacturer of blowers, exhausters, pumps and meters, has removed its New York office to 24 State Street. D. L. Dowling, district manager, heads the New York staff, which includes N. C. Barnard and A. E. Loyd, sales engineers.

A combined practical and theoretical one-week course in designing for welded construction will be repeated several times during the winter season by the John Huntington Polytechnic Institute, Cleveland, in cooperation with the Lincoln Electric Co. The course, which is restricted to 30 men who must be graduate engineers or have equivalent practical experience, covers a week's intensive work, six days being spent in the operator's training school of the Lincoln Electric Co. Lectures on designing for are welded construction will be given in the evenings at the Huntington institute. Further information respecting the course may be obtained from Alfred Mewett, dean of the institute, or from E. W. P. Smith, Box 683, Cleveland.

Orders for electric industrial trucks and tractors in October rose to 29 units from 17 in September, according to reports received by the Bureau of the Census from 10 manufacturers.

Fabricated Structural Steel

Lettings in Larger Volume—New Projects Decline

AWARDS, at 8500 tons, were more than double those in the previous week. A State hospital at Brentwood, N. Y., will take 1050 tons and bridge work in various sections of the country accounts for 4650 tons. New projects of 9400 tons compare with 16,700 tons a week ago. Outstanding inquiries are 1500 tons for a Government central heating plant at Washington, 1200 tons for a post office at Forth Worth, Tex., and 1100 tons for three bridges in Pennsylvania. Awards follow:

NORTH ATLANTIC STATES

Brentwood, N. Y., 1050 tons, State hospital buildings, to Lehigh Structural Steel Co.

Oneonta, N. Y., 540 tons, tuberculosis sanitarium, to Ingalls Iron Works.

Orangeburg, N. Y., 535 tons, Rockland State Hospital, to Bethlehem Fabricators, Inc.

Huntington, N. Y., 260 tons, hospital, to George A. Just Co.

State of New York, 115 tons, highway bridge in Otsego County, to Lackawanna Steel Construction Corp.

Rome, N. Y., 100 tons, highway bridge, to Lackawanna Steel Construction Corp.

Beaver County, Pa., 210 tons, court house, to Pittsburgh Bridge & Iron Co.

State of Pennsylvania, 750 tons for Department of Property and Supplies, to McClintic-Marshall Corp., Jones & Laughlin Steel Corp., Fort Pitt Bridge Works Co., Bethlehem Fabricators, Inc., Belmont Iron Works and Guilbert Steel Co.

THE SOUTH

State of Texas, 690 tons, bridges in McLellan and Guadalupe counties, to Virginia Bridge & Iron Co.

CENTRAL STATES

State of Ohio, 690 tons, highway bridges in Lawrence and Warren counties, to Dodge-Hussey, Inc.

Justice Park, Ill., 1500 tons, bridge, to American Bridge Co.

Milwaukee Road, 160 tons, bridge, to Worden-Allen Co.

Sturgis, S. D., 160 tons, Fort Meade riding academy, to Gate City Iron Works, Bismarck, N. D.

WESTERN STATES

State of Utah, 230 tons, highway bridges in Tooele County, to Minneapolis-Moline Power Implement Co.

Modesto, Cal., 1150 tons, Tuolumne River bridge, to Moore Dry Dock Co.

Sacramento, Cal., 223 tons, Yolo causeway State highway extension, to Moore Dry Dock Co.

San Francisco, 100 tons, pier extension at Fort Mason, to Judson-Pacific Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Concord, N. H., 500 tons, State bridge on Daniel Webster Highway.

Cambridge, Mass., 200 tons, municipal building.

Springfield, Vt., 112 tons, State bridge.

State of Pennsylvania, 1100 tons, bridges: Forest County, 470 tons; Warren County, 400 tons; Washington County, 230 tons.

New Castle, Pa., 200 tons, post office.

Washington, 1500 tons, United States Government central heating plant.

SOUTH AND SOUTHWEST

Fort Worth, Tex., 1200 tons, post office.

State of Oklahoma, 200 tons, highway bridges: Osage County and Kiowa County 100 tons each, bids to be opened Nov. 22.

CENTRAL STATES

State of Ohio, 1000 tons, highway bridges at Port Clinton, Woodville and Peebles.

State of Illinois, 858 tons, highway bridges: Knox County, 208 tons; Bureau County, 300 tons and Champaign County, 150 tons, bids to be opened Nov. 30.

Missouri Pacific Railroad, 370 tons, bridge.

Chicago, 250 tons, additions to general exhibits building at World's Fair.

Miller County, Mo., 600 tons, highway bridges.

Fountain City, Wis., 1400 tons, locks and dam; previously reported at 685 tons.

WESTERN STATES

Granada, Colo., 740 tons, State highway bridge; bids closed Nov. 16.

Reinforcing Steel

Awards 650 Tons—New Projects 2700 Tons

AWARDS

Orangeburg, N. Y., 300 tons, Rockland State Hospital, to Capitol Steel Corp.

Yellowstone Park, Mont., 108 tons, grand loop highway section, to Kalman Steel Corp.

Shasta County, Cal., 100 tons, State highway bridges, to Soule Steel Co.

Monterey and Alameda Counties, Cal., 125 tons, highway bridges, to Concrete Engineering Co.

NEW REINFORCING BAR PROJECTS

Revere, Mass., 120 tons, State bridge over Boston & Maine Railroad.

Kings Park, N. Y., 510 tons, State hospital buildings; bids opened Nov. 16.

State of New Jersey, 503 tons, viaduct, route 21, section 1-A, over tracks of Pennsylvania Railroad and Lehigh Valley; J. F. Chapman & Son, Hillside, N. J., low bidders on general contract.

Stewart, Fla., 300 tons, bridge over St. Lucy River.

State of Ohio, 1370 tons, Brook Park bridge; previously reported as 1000 tons.

State of Indiana, 1000 tons, paving projects; bids to be opened Nov. 22.

State of Oklahoma, 100 tons, Osage County highway bridge; bids to be opened Nov. 22.

Granada, Colo., 100 tons, two State highway bridges; bids closed Nov. 16.

Ventura, Cal., 122 tons, Santa Clara River highway paving; bids to be closed Nov. 30.

Cast Iron Pipe

Winchester, Va., is considering recommendations of Whitman, Requaert & Smith, Baltimore Trust Building, Baltimore, consulting engineers, for 10-mile line for Cedar Creek-Marlboro water supply system.

Campbell's Point, Wis., is in the market for 125 tons.

Madison, Wis., will purchase 150 tons.

Grand Island, Neb., has ordered 3000 tons from an unnamed bidder.

Blair, Neb., has placed 100 tons with Central Foundry Co.

Long Pine, Neb., has ordered 100 tons from Central Foundry Co.

Hawaiian Dredging Co. is low bidder on general contract for two and one-half miles of 6-in., about 170 tons, for United States Navy base at West Loch, Oahu, T. H.

Pipe Lines

Detroit Southern Pipe Line Co., Frederick C. Gielow, 1118 Ford Building, Detroit, president and attorney, has secured permission to build two 6-in. gasoline steel pipe lines from refinery at Toledo, Ohio, to vicinity of Detroit, about 70 miles. Project will include storage and distributing plant on Buffalo Road, near Conant, Mich.

Board of District Commissioners, District Building, Washington, asks bids until Nov. 21 for 7600 ft. of 48-in. water main of steel, wrought iron or cast iron pipe (alternate bids).

Standard Gas Co., Inc., Nashville, Tenn., formerly known as Dickson County Oil & Gas Co., has awarded contract to Southern Engineering & Appraisal Co., Nashville, for 8-in. natural gas line from company wells in Dickson County to Nashville and vicinity, about 30 miles. Standard company will operate with a capital of \$2,500,000.

Railroad Equipment

United States Navy Department has awarded two 50-ton steel box cars to General American Tank Car Corp. for Naval Ammunition Depot, Fort Mifflin, Hog Island, Pa.

Pennsylvania Railroad has started to fabricate plates and assemble parts in its shops for 925 steel box cars and 360 steel automobile cars, which will be constructed with funds from \$2,000,000 "work loan" from Reconstruction Finance Corporation.

Detroit Scrap Prices Decline in Dull Market

DETROIT, Nov. 15.—Stagnation in the local scrap market has brought prices of open-hearth grades, including heavy melting steel and blast furnace items down 25c. a ton. The district steel plant is cutting down inventories as the year-end approaches; consequently is buying no scrap at the moment. Dealers expect little change in the situation in the immediate future.

Hudson To Use Camshaft of Electric Alloy Iron

The Hudson Motor Car Co. has adopted as standard equipment for its Essex Terraplane a camshaft made of electric furnace alloy cast in special molds of metal and sand and produced by the Campbell Wyant & Cannon Foundry Co., Muskegon Heights, Mich. The alloy iron bears the trade-name Proferall, which stands for processed ferrous alloy, has a tensile strength of 50,000 to 70,000 lb. per sq. in. and a Brinell hardness of 300.

One of the chief advantages of the new camshaft is its lessened cost owing to the much smaller expense of making patterns compared with forging dies and to the elimination of some machining operations.

This action on the part of the Hudson company is the forerunner of the introduction next year by a prominent automobile manufacturer of an electric furnace alloy iron crankshaft and camshaft as standard equipment.

Non-Ferrous Prices Move Higher, Despite Light Consumer Buying

NEW YORK, Nov. 16.—Improved sentiment and a sustained export demand for electrolytic copper have imparted decided firmness to the domestic market. With export sales having been made during the week at from 5.60c. to 5.80c., c.i.f. European ports, custom smelters, notwithstanding the continued lack of buying interest here, are apparently determined to close up the gap between foreign values and the domestic price. As a result, the Connecticut basis was boosted today to 5.50c. a lb. for delivery through first quarter. Although one smelter holds nominally at 5.37½c., the domestic price is more clearly defined at the higher level. Primary producers are still out of this market at their nominal posting of 6.25c. Offsetting the absence of fresh buying in the domestic market is the steady increase in consumption. A 20 per cent increase in October deliveries over those in September marked the third consecutive monthly gain in shipments. November releases are expected to maintain this uptrend in de-

liveries, while specifications for December are encouraging.

Tin

Little buying or selling interest was displayed during the week. Consequently, the market was devoid of significant trends. The New York price of tin scored a net gain for the week of 40 points. This advance, however, was influenced primarily by upward fluctuations in sterling exchange. London prices also moved upward during the week, with today's quotations £156 10s. a ton for spot standard, £157 5s. for future standard and £162 for spot Straits. Today's Singapore market, at £162, was almost £4 higher than a week ago. United Kingdom warehouse stocks of tin shrunk 344 tons in the past week to 30,719 tons. Shipments from the East up to and including Nov. 12 amounted to 2824 tons, reflecting a better monthly rate than in October.

Lead

Although recent demand has fallen

short of important volume, the steadiness of consumer buying has been sufficient to absorb the daily intake of the chief factors. Current sales are principally for December, though a fair amount of November buying is still in prospect. With most lead consumers basing purchases against actual needs, the usual drop in contracting accompanying year-end stock taking is not expected this year to be so abrupt as in previous years, though buying next month will undoubtedly taper off perceptibly. Prices, which early last week were advanced to 3c., St. Louis, and 3.15c., New York, are apparently firmly established.

Zinc

Reluctance of leading smelters to sell, rather than eagerness of consumers to buy, has forced prime Western up \$3 a ton for the week to 3.15c., East St. Louis, or 3.52c., New York. A further strengthening factor attending the rising values was the stronger ore market at the close of last week.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 9	Nov. 10	Nov. 11	Nov. 12	Nov. 14	Nov. 15
Lake copper, New York.....	5.25	5.25	5.37½	5.37½	5.37½	5.50
Electrolytic copper, N. Y.*.....	5.00	5.00	5.12½	5.12½	5.12½	5.25
Straits tin, spot, N. Y.....	23.70	23.60	24.00	24.00	24.15	24.05
Zinc, East St. Louis.....	3.00	3.00	3.05	3.05	3.15	3.15
Zinc, New York.....	3.37	3.37	3.42	3.42	3.52	3.52
Lead, St. Louis.....	3.00	3.00	3.00	3.00	3.00	3.00
Lead, New York.....	3.15	3.15	3.15	3.15	3.15	3.15

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.87½c. a lb., New York.
Brass ingots, 85-5-5-5, 5.75c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	25.75c. to 26.75c.
Tin, bar.....	27.75c. to 29.75c.
Copper, Lake.....	7.50c. to 8.50c.
Copper, electrolytic.....	7.25c. to 8.25c.
Copper, casting.....	7.00c. to 8.00c.
*Copper sheets, hot-rolled.....	15.37½c.
*High brass sheets.....	12.50c.
*Seamless brass tubes.....	15.25c.
*Seamless copper tubes.....	14.37½c.
*Brass rods.....	10.25c.
Zinc, slabs.....	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig.....	3.75c. to 4.25c.
Lead, bar.....	5.25c. to 6.25c.
Lead sheets.....	6.75c.
Antimony, Asiatic.....	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	16.00c.
Solder, ½ and ⅓.....	15.50c. to 16.50c.
Babbitt metal, commercial grade.....	21.00c. to 22.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	27.50c.
Tin, bar.....	29.50c.

Copper, Lake.....	7.25c.
Copper, electrolytic.....	7.25c.
Copper, casting.....	6.875c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig.....	3.75c. to 4.00c.
Lead, bar.....	7.25c.
Antimony, Asiatic.....	8.50c.
Babbitt metal, medium grade.....	16.50c.
Babbitt metal, high grade.....	31.25c.
Solder, ½ and ⅓.....	17.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	4.00c.	4.75c.
Copper, hvy. and wire.....	3.75c.	4.50c.
Copper, light and bottoms.....	2.875c.	3.625c.
Brass, heavy.....	1.875c.	2.625c.
Brass, light.....	1.375c.	2.00c.
Hvy. machine composition.....	2.75c.	3.50c.
No. 1 yel. brass turnings.....	2.25c.	2.625c.
No. 1 red brass or compos. turnings.....	2.50c.	3.25c.
Lead, heavy.....	2.25c.	2.75c.
Zinc.....	1.25c.	1.625c.
Cast aluminum.....	3.75c.	5.25c.
Sheet aluminum.....	8.00c.	9.50c.

Bullard-Dunn Process Introduced in Europe

Langbein-Pfanhauser-Werke, Leipzig, Germany, has concluded an agreement with the Bullard Co., Bridgeport, Conn., under the terms of which it is to introduce the Bullard-Dunn metal descaling process in Great Britain and on the Continent. The German company has long been active in the field of electro deposition and cleaning of metal surfaces. The Bullard-Dunn process is an electrochemical method of removing scale, oxides, grease and dirt without damage to metal surfaces. Simplicity and economy are features.

"Flame Machining" is described at length in the November issue *Oxy-Acetylene Tips*, published by the Linde Air Products Co., 30 East Forty-second Street, New York. This process, reported in THE IRON AGE of Oct. 13, page 583, differs from the usual oxy-acetylene flame cutting only in the character of the cuts produced. Its main distinction is use of a tangential positioning of the cutting oxygen stream in respect to the work. The article includes discussion of flame planing (including descaling and hogging), milling, turning, drilling, boring and precision cutting; also the rate of cutting and the oxygen consumption.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	
Base per Lb.	
Pittsburgh mill	1.60c.
Chicago	1.70c.
Philadelphia	1.91c.
New York	1.95c.
Detroit	1.80c.
Cleveland	1.55c.
Lackawanna	1.70c.
Birmingham	1.75c.
Pacific ports	2.10c.

Billet Steel Reinforcing	
(as quoted by distributors)	
Base per Lb.	
P'gh mills, 40, 50, 60-ft.	1.60c.
Birmingham, mill lengths	1.75c.
Cleveland	1.60c. to 1.75c.

Rail Steel	
Base per Lb.	
P'gh mills, east of Chicago dist.	1.35c. to 1.45c.
Chicago Heights mills	1.50c.

Iron	
Base per Lb.	
Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.80c.
Common iron, del'd New York	1.90c.

Tank Plates	
Base per Lb.	
Pittsburgh mill	1.60c.
Chicago	1.70c.
Birmingham	1.75c.
Cleveland	1.80c.
Philadelphia	1.7935c.
P'gh mills	1.70c.
Sparrows Point	1.70c.
Del'd New York	1.898c.
Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes	
Base per Lb.	
Pittsburgh mill	1.60c.
Chicago	1.70c.
Birmingham	1.75c.
Lackawanna	1.70c.
Philadelphia	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.8675c.
C.I.F. Pacific ports (standard)	2.10c.
C.I.F. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling	
Base per Lb.	
Pittsburgh	1.90c.
Chicago mill	2.05c.
Buffalo	2.00c.

Alloy Steel Bars	
Base per Lb.	
Pittsburgh, Chicago, Buffalo, Hamilton or Canton	
Alloy Quantity Bar Base, 2.45c. per Lb.	
S.A.E. series	Alloy
Numbers	Differential
2000 (1/4% Nickel)	\$0.25
2100 (1 1/4% Nickel)	0.55
2300 (3/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
4100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flat)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with section area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*	
Base per Lb.	
Pittsburgh mill	1.70c.
Chicago	1.75c.
Cleveland	1.75c.
Buffalo	1.75c.
Detroit	1.90c.
Eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill	
1 1/2 in. 3.00c.	
1 3/16 to 1 1/2 in. 2.50c.	
1 1/16 to 1 1/2 in. 2.35c.	
1 1/16 to 2 1/2 in. 2.20c.	
2 1/16 to 6 in. 2.05c.	

*In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets	
Hot-Rolled	
Base per Lb.	
No. 10 f.o.b. Pittsburgh	1.55c.
No. 10 f.o.b. Chicago mill	1.65c.
No. 10 del'd Philadelphia	1.80c.
No. 10 f.o.b. Birmingham	1.70c.
No. 10, c.i.f. Pacific Coast ports	2.17 1/2c.

Hot-Rolled and Annealed	
Base per Lb.	
No. 10, Pittsburgh	1.70c.
No. 10, Chicago mill	1.85c.
No. 10, Birmingham	1.85c.
No. 10, Pacific Coast ports	2.32 1/2c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed	
Base per Lb.	
No. 24, f.o.b. Pittsburgh	2.10c. to 2.20c.
No. 24, f.o.b. Chicago mill	2.20c. to 2.30c.
No. 24, del'd Philadelphia	2.41c. to 2.51c.
No. 24, f.o.b. Birmingham	2.35c.
No. 24, c.i.f. Pacific Coast ports	2.85c.
No. 24 wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
Base per Lb.	
No. 10 gage, f.o.b. Pittsburgh	2.00c. to 2.10c.
No. 10 gage, f.o.b. Chicago mills	2.10c. to 2.20c.
No. 10 gage, del'd Philadelphia	2.41c. to 2.51c.

Light Cold-Rolled	
Base per Lb.	
No. 20 gage, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20 gage, f.o.b. Chicago Mills	2.60c. to 2.70c.
No. 20 gage, del'd Philadelphia	2.81c. to 2.91c.

Automobile Body Sheets	
Base per Lb.	
No. 20, f.o.b. Pittsburgh	2.55c. to 2.65c.

Steel Furniture Sheets	
Base per Lb.	
No. 10, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20, f.o.b. Pittsburgh	2.90c. to 3.00c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets	
Base per Lb.	
No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago mill	2.95c.
No. 24, del'd Philadelphia	3.16c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, c.i.f. Pacific Coast ports	3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes	
Base per Lb.	
No. 24, unassorted, 8-lb. coating, f.o.b. P'gh	2.70c. to 2.80c.

Vitricous Enameling Stock	
Base per Lb.	
No. 10, f.o.b. Pittsburgh	2.60c.
No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate	
Base per Lb.	
No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c. to 2.50c.

Tin Plate	
Base per Box	
Standard cokes, f.o.b. P'gh district mill	\$4.75
Standard cokes, f.o.b. Gary	4.85

Terne Plate	
(F.o.b. Morganston or Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.	
Base per Lb.	
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in., Chicago	1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips	
Base per Lb.	
F.o.b. Pittsburgh	2.00c.
F.o.b. Cleveland	2.20c.
Del'd Chicago	2.30c.
F.o.b. Worcester	2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.70c. to 2.75c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carload will be applied on all merchant wire products.)

To Manufacturing Trade	
Base per Lb.	
Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade	
Base per Kg.	
Standard wire nails	\$1.95
Smooth coated nails	1.95
Galvanized nails	3.95

Seamless Mechanical Tubing	
Per Cent Off List	
Carbon, 0.10% to 0.30% base (carloads) 55	
Carbon, 0.30% to 0.40% base	50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

Woven wire fence No. 9 gage, per net ton	
Black	\$55.00
Woven wire fence, No. 12 1/2 gage and lighter, per net ton	
Black	60.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld	
Inches Steel Black Galv.	
1/4 to 3/8	51 1/2 28 1/2
3/8 to 1/2	57 34 1/2 + 29 1/2
1/2 to 3/4	62 49 1/2 28 10 1/2
3/4 to 1	65 55 3/4 33 16 1/2
1 to 3	67 57 1 1/2 36 20 1/2
3 to 4	68 58 1 1/2 38 21

Lap Weld	
Inches Steel Black Galv.	
2 1/2 to 6	61 50 1/2 26 12 1/2
6 to 8	64 54 2 1/2 to 3 1/2 33 18 1/2
8 to 10	62 52 4 to 6 35 22
10 to 12	60 49 7 and 8 34 21 1/2
12 to 14	59 48 9 to 12 31 16 1/2

Butt Weld, extra strong, plain ends	
Inches Steel Black Galv.	
1/4 to 3/8	48 33 1/2 + 17 + 49 1/2
3/8 to 1/2	53 38 1/2 3/4 + 7 + 41
1/2 to 3/4	59 49 1/2 28 12 1/2
3/4 to 1	63 54 3/4 33 17 1/2
1 to 3	65 56 1 to 2 39 23
2 to 3	69 57

Lap Weld, extra strong, plain ends	
Inches Steel Black Galv.	
2 1/2 to 4	59 49 1/2 2 1/2 to 3 34 18 1/2
4 1/2 to 6	62 52 1/2 4 1/2 to 6 38 24
6 to 8	60 50 7 & 8 36 22
8 to 10	58 48 9 to 12 36 23 1/2
10 to 12	56 46 12 39 24

Discounts on steel and wrought iron pipe are not and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh	
Steel	
2 in. and 2 1/2 in.	1 1/2 in. 1
3 in.	38 1 1/2 in. 8
3 1/2 in.—2 1/2 in. 46	2 in.—2 1/2 in. 13
3 in.	52 2 1/2 in.—2 1/2 in. 16
3 1/2 in.—3 in. 54	3 in. to 3 1/2 in. 17
4 in.	57 3 1/2 in. to 3 1/2 in. 18
4 1/2 in. to 6 in. 46	4 in. 20
	4 1/2 in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb. 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn	
Inches	
1 in.	61 3 in. 46
1 1/4 to 1 1/2 in. 53	3 1/4 to 3 1/2 in. 48
1 1/2 in.	57 4 in. 51
2 to 2 1/4 in. 52	4 1/2, 5 and 6 in. 40
2 1/4 to 2 1/2 in. 49	

Hot Rolled	
Inches	
2 and 2 1/4 in. 38	3 1/4 to 3 1/2 in. 54
2 1/2 and 2 3/4 in. 46	4 in. 57
3 in.	52 4 1/2, 5 and 6 in. 46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages takes the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

SEMI-FINISHED STEEL

Billets and Blooms	
Per Gross Ton	
Rolling, 4 in. to 6 in., inclusive, Pittsburgh	\$26.00
Rolling, 4 in. to 6 in., inclusive, Youngstown	26.00
Rolling, 4 in. to 6 in., inclusive, Cleveland	26.00
Rolling, 4 in. to 6 in., inclusive, Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

Per Gross Ton	
Pittsburgh	\$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

Per Gross Ton	
(8 in. x 2 in. and under 18 in. x 10 in.) Pittsburgh	\$26.00
Youngstown	26.00
Cleveland	26.00

RAILS AND TRACK SUPPLIES

Rails	
Per Gross Ton	
Standard, f.o.b. mill	\$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	36.00

Track Equipment

Base per 100 Lb.	
Spikes, 9/16-in. and large	\$2.46
Spikes, 3/4-in. and large	2.40
Spikes, heat and barge	2.80
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.30
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

Base per 100 Lb.	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	

Per Cent Off List

(F.O.B. Pittsburgh or Youngstown)

Grooved	Per Lb.
Universal	1.80c
Sheared	1.60c

Wire Rods
(Common soft, base)

Pittsburgh	Per Gross Ton
Cleveland	\$37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

Furnace, f.o.b. Connellsville	Per Net Ton
Prompt	\$1.75 to \$2.00
Furnace, f.o.b. Connellsville	
Prompt	2.75 to 4.25
Foundry, by-product, Chicago	
ovens, for delivery outside	7.00
switching districts	
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
land, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b., ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

Mine run steam coal, f.o.b. W. Pa. mines	Per Net Ton
Mine run coking coal, f.o.b. W. Pa. mines	\$1.20 to \$1.30
Gas coal, 1/2-in., f.o.b. Pa. mines	1.30 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.40
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	0.50 to 0.65
Gas slack, f.o.b. W. Pa. mines	0.50 to 0.65

Fuel Oil

Per Gal. f.o.b. Bapone, N. J.	
No. 3 distillate	4.00c
No. 4 industrial	3.50c
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c
No. 4 industrial	3.50c
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	2.80c to 2.90c
No. 5 industrial fuel oil	2.45c to 2.50c
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.00c
No. 4 industrial	4.50c

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works	
High heat	Intermediate
Duty Brick	
Penn.	\$35.00 to \$36.00
Maryland	35.00 to 36.00
New Jer.	\$44.00 to 57.00
Ohio	35.00 to 36.00
Kentucky	35.00 to 36.00
Missouri	35.00 to 36.00
Illinois	35.00 to 36.00
Ground fire clay, per ton	6.50

Chrome Brick

Standard size	Per Net Ton
	\$12.50

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	Per Net Ton
Unburned, f.o.b. Baltimore	\$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	52.00
Domestic f.o.b. Chewelah, Wash.	38.50
	29.90

CAST IRON PIPE

4 in. and larger, del'd	Per Net Ton
Chicago	\$38.40 to \$41.40
4 in. and larger, del'd New York	41.40 to 44.40
4 in. and larger, del'd New York	33.30
4 in. and larger, Birm'ham	\$32.00 to 33.00
1-in., Birmingham	35.00 to 36.00

*Class "A" and gas pipe, \$3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	\$13.50
Bessemer	15.00
Gray forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	\$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c to \$1.26.

CHICAGO

Per gross ton at Chicago furnace:

N't'n No. 2 fdy.	\$15.50
N't'n No. 1 fdy.	16.00
Malleable, not over 2.25 sil.	15.50
High phosphorus	15.50
Lake Superior charcoal, del'd	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free	25.00
Silvery, sil. 8 per cent.	23.67
Bessa. ferro-sil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd	17.50
St. Louis	\$18.30 to 18.80
Southern No. 2 fdy., del'd	14.50
Northern malleable, del'd	18.30 to 18.80
Northern basic, del'd	18.30 to 18.80

Freight rates 83c (average) Granite City to St. Louis; \$2.30 from Chicago; \$1.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

* Buffalo, No. 2, del'd cast	\$17.41 to \$17.66
East Pa. No. 2 fdy.	15.02 to 15.52
East Pa. No. 2X fdy.	15.52 to 16.02

Freight rates, \$1.52 to \$2.63 from eastern Pennsylvania.
* Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	\$16.00
No. 2X fdy.	17.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

* Buffalo, sil. 1.75 to 2.25	\$19.05
* Buffalo, sil. 2.25 to 2.75	19.05
* Buffalo, sil. 1.75 to 2.25	17.41
* Buffalo, sil. 2.25 to 2.75	17.41
* Ala., sil. 1.75 to 2.25	15.64
* Ala., sil. 2.25 to 2.75	16.14

Freight rates, \$5.05 all rail from Buffalo, and \$3.41 all rail and water from Buffalo when \$1 large and \$2 to \$2.50 New England freight rate are obtainable; \$5.61 rail and water from Alabama to New England seaboard.
* All-rail rate.
† Rail-and-water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N't'n No. 2 foundry	\$17.01 to 17.59
S't'h'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N't'n No. 2 fdy. (local delivery)	\$15.00
S't'h'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent.	21.87
Stand. low phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	\$13.50 to \$14.09
East. Pa. No. 2X	14.09 to 14.59
East. Pa. No. 1X	14.59 to 15.09
Basic (del'd east. Pa.)	13.50 to 14.00
Malleable	14.74 to 18.01
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Cop. b'r'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: \$4c to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 fdy., sil. 1.75 to 2.25	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

Domestic, 80% seaboard, \$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid 68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

Domestic, 10 to 21%	\$24.00
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Electric Ferro-silicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (less carloads)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b.) Welland, Ont., in carloads	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferro-silicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	
10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	
6%	\$18.00
7%	18.50
8%	19.00
9%	19.50
10%	20.00
11%	20.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	91c
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Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%	\$20.50
12%	21.00
13%	21.50
15%	22.50
17%	26.50

Per Gross Ton

10%

No. 2 busheling.....	\$2.00 to \$2.50
Locomotive tires, smooth.....	7.50 to 8.50
Pipe and flues.....	1.25 to 1.75
No. 1 machinery cast.....	6.25 to 6.75
Clean automobile cast.....	6.75 to 7.25
No. 1 railroad cast.....	5.50 to 6.00
No. 1 agricultural cast.....	5.75 to 6.25
Stove plate.....	5.50 to 6.00
Grate bars.....	5.25 to 5.75
Brake shoes.....	6.25 to 6.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$7.00 to \$7.50
No. 2 heavy melting steel.....	5.50 to 6.00
No. 1 railroad wrought.....	7.50 to 8.00
Bundled sheets.....	4.00 to 4.50
Hydraulic compressed, new.....	6.00 to 6.50
Hydraulic compressed, old.....	4.00 to 4.50
Machine shop turnings.....	3.50 to 4.00
Heavy axle turnings.....	5.50 to 6.00
Cast borings.....	3.50 to 3.75
Heavy breakable cast.....	9.00 to 9.50
Stove plate (steel works).....	6.00 to 6.50
No. 1 low phosph. heavy.....	10.00 to 10.50
Couplers and knuckles.....	8.50 to 9.00
Roller steel wheels.....	8.50 to 9.00
No. 1 blast furnace.....	3.50 to 3.75
Spec. iron and steel pipe.....	6.50 to 7.00
Stairing.....	12.00 to 13.00
Steel axes.....	12.00 to 13.00
No. 1 forge iron.....	5.50 to 6.00
Cast iron car wheels.....	9.00 to 9.50
No. 1 cast.....	9.00 to 9.50
Cast borings (chem.).....	8.00 to 10.00
Steel rails for rolling.....	9.00 to 9.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.....	\$7.50 to \$8.00
No. 2 heavy melting steel.....	7.00 to 7.50
Compressed steel.....	6.00 to 6.50
Light bundled sheet stampings.....	4.00 to 4.50
Drop forge flashings.....	5.25 to 5.75
Machine shop turnings.....	4.00 to 4.50
Short shoring turnings.....	4.50 to 5.00
No. 1 busheling.....	5.25 to 5.50
Steel axle turnings.....	5.00 to 5.50
Low phosph. billet crops.....	10.00 to 11.00
Cast iron borings.....	4.75 to 5.25
Mixed borings and short turnings.....	4.75 to 5.25
No. 2 busheling.....	4.75 to 5.25
No. 1 cast.....	7.50 to 8.00
Railroad grate bars.....	5.00 to 5.50
Stove plate.....	5.00 to 5.50
Rails under 3 ft.....	8.50 to 9.00
Rails for rolling.....	8.50 to 9.00
Railroad malleable.....	6.75 to 7.00
Cast iron car wheels.....	8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel.....	\$7.00
No. 2 heavy melting scrap.....	\$6.25 to 6.75
Scrap rails.....	6.75 to 7.25
New hydraulic, comp. sheets.....	6.25 to 6.75
Old hydraulic, comp. sheets.....	5.00
Drop forge flashings.....	5.75 to 6.25
No. 1 busheling.....	6.25 to 6.75
Heavy steel axle turnings.....	6.00
Machine shop turnings.....	4.00 to 4.50
Knuckles and couplers.....	10.00
Coll and leaf springs.....	10.00
Roller steel wheels.....	10.00
Low phosph. billet crops.....	9.00 to 9.50
Short shoring turnings.....	5.50 to 6.00
Short mixed borings and turnings.....	3.75 to 4.25
Cast iron borings.....	3.75 to 4.25
No. 2 busheling.....	3.50 to 4.00
Steel car axles.....	10.00 to 11.00
Iron axes.....	10.00 to 11.00
No. 1 machinery cast.....	9.50 to 10.00
No. 1 cupola cast.....	8.50 to 9.00
Stove plate.....	8.50 to 9.00
Steel rails, 3 ft. and under.....	9.25 to 9.75
Cast iron car wheels.....	8.00 to 9.00
Industrial malleable.....	7.00 to 7.50
Railroad malleable.....	7.00 to 7.50
Chemical borings.....	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel.....	\$7.50 to \$8.00
Scrap steel rails.....	8.00 to 8.50
Short shoring turnings.....	4.00
Stove plate.....	6.00
Steel axes.....	9.00
Iron axes.....	9.00
No. 1 railroad wrought.....	4.50 to 5.00
Rails for rolling.....	8.00 to 8.50
No. 1 cast.....	8.50
Tramcar wheels.....	8.50
Cast iron borings, chem.....	8.50

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel.....	\$6.00 to \$6.50
No. 1 heavy melting.....	5.50 to 6.00
No. 2 heavy melting.....	5.00 to 5.50
No. 1 locomotive tires.....	5.00 to 5.50
Wire stand-sec. rails.....	6.00 to 6.50
Railroad springs.....	7.25 to 7.75
Bundled sheets.....	2.00 to 2.50
No. 2 railroad wrought.....	5.00 to 5.50
No. 1 busheling.....	3.50 to 4.00
Cast iron borings and shoring turnings.....	2.75 to 3.25
Iron rails.....	7.00 to 7.50
Rails for rolling.....	2.00 to 2.50
Machine shop turnings.....	2.00 to 2.50
Heavy turnings.....	3.00 to 3.50
Steel car axles.....	8.50 to 9.00
Iron car axles.....	11.00 to 11.50
Steel, iron bars and trans.....	3.00 to 3.50
No. 1 railroad wrought.....	4.00
Steel rails less than 3 ft.....	7.50 to 8.00
Steel angle bars.....	6.00 to 6.50

Cast iron car wheels.....	5.50 to 6.00
No. 1 machinery cast.....	6.50 to 7.00
Railroad malleable.....	4.00 to 4.50
No. 1 railroad cast.....	4.25 to 4.75
Stove plate.....	6.00 to 6.50
Relay rails, 60 lb. and under.....	16.00 to 16.50
Relay rails, 60 lb. and over.....	20.00 to 21.00
Agricult. malleable.....	4.00 to 4.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$4.00 to \$4.50
No. 2 heavy melting steel.....	3.00
Heavy melting steel (yard).....	1.50
No. 1 hvy. breakable cast.....	5.00 to 5.25
Stove plate (steel works).....	2.50 to 2.90
Machine shop turnings.....	0.75 to 1.25
Short shoring turnings.....	0.75 to 1.25
Cast borings.....	0.50 to 1.00
No. 1 blast furnace.....	0.50 to 1.00
Steel car axles.....	8.00 to 8.50
Spec. iron and steel pipe.....	2.50 to 2.75
Forge fire.....	2.75 to 3.00
No. 1 railroad wrought.....	4.00 to 4.50
No. 1 yard wrought, long.....	3.25 to 3.50
Rails for rolling.....	5.00 to 5.50
No. 1 cast.....	5.00 to 5.50
No. 2 cast.....	4.50 to 5.00
Stove plate (foundry).....	4.50
Malleable bands (rolled).....	4.00 to 4.50
Cast borings (chemical).....	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast.....	\$9.00
No. 1 hvy. cast (cupola size).....	7.50 to 8.00
No. 2 cast.....	4.00 to 4.50

PITTSBURGH

Base per lb.	
Plates.....	2.85c
Structural shapes.....	2.85c
Soft steel bars and small shapes.....	2.60c
Reinforcing steel bars.....	2.60c
Cold-finished and screw stock.....	
Rounds and hexagons.....	2.95c
Squares and flats.....	3.15c
Hoops.....	2.95c
Hot-rolled annealed sheets (No. 24).....	3.15c
25 or more bundles.....	3.15c
Galv. sheets (No. 24), 25 or more bundles.....	3.65c
Hot-rolled sheets (No. 10).....	3.10c
Galv. corrug. sheets (No. 24), per square (less than 3750 lb.).....	\$3.74
Spikes, large.....	2.10c
Small.....	2.65c to 2.80c
Roat.....	2.90c
Track bolts, all sizes, per 100 count.....	70 per cent off list
Machine bolts, 100 count.....	70 per cent off list
Carriage bolts, 100 count.....	70 per cent off list
Nuts, all styles, 100 count.....	70 per cent off list
Large rivets, base per 100 lb.....	\$3.00
Wire, black, soft ann'd, base per 100 lb.....	2.75
Wire, galv. soft, base per 100 lb.....	3.20
Common wire nails, per keg.....	2.35
Cement coated nails, per keg.....	2.35
On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 100 to 999 lb.	

CHICAGO

Base per lb.	
Plates and structural shapes.....	3.00c
Soft steel bars.....	2.75c
Reinforce. bars, billet steel.....	1.50c
Rail steel reinforcement.....	1.15c to 1.25c
Cold-fn. steel bars and shafting.....	
Rounds and hexagons.....	3.00c
Flats and squares.....	3.50c
Rounds, 3/4 in. (in Nos. 10 and 12 gages).....	2.95c
Hoops (No. 14 gage and lighter).....	3.50c
Hot-rolled annealed sheets (No. 24).....	3.55c
Hot-rolled sheets (No. 10).....	4.10c
Spikes (3/4 in. and lighter).....	3.45c
Track bolts.....	4.30c
Rivets, structural.....	3.75c
Rivets, boiler.....	3.75c
Per Cent Off List	
Machine bolts.....	70
Carriage bolts.....	70
Coach and lag screws.....	70
Hot-pressed nuts, sq. tap or blank.....	70
Hot-pressed nuts, hex. tap or blank.....	70
Hex. head cap screws.....	80 and 10
Cup point set screws.....	75 and 10
Flat head bright wood screws.....	82 1/2 and 10
Spring cotter pins.....	60
Store bolts.....	80
Rd hd tank rivets, 7/16 in. and smaller.....	65
Wrought washers.....	\$4.50 off list
No. 8 black ann'd wire, per 100 lb.....	\$3.45
Com. wire nails, base per keg.....	2.30
Cement c'd nails, base per keg.....	2.30

NEW YORK

Base per lb.	
Plates and struc. shapes.....	3.10c
Soft steel bars, small shapes.....	3.10c
Iron bars.....	3.20c
Iron bars, Swed. charcoal.....	6.00c to 6.50c
Cold-fn. shafting and screw stock.....	
Rounds and hexagons.....	3.30c
Flats and squares.....	3.80c
Cold-rl. strip, soft and quarter hard.....	4.95c
Hoops.....	3.30c
Rounds.....	3.30c
Hot-rolled sheets (No. 10).....	3.00c
Hot-rolled ann'd sheets (No. 24).....	3.50c
Galvanized sheets (No. 24).....	4.00c
Long term sheets (No. 24).....	4.50c
Standard tool steel.....	12.00c
Wire, black annealed (No. 10).....	3.00c
Wire, galv. annealed (No. 10).....	4.05c
Tire steel 3/4 x 1/4 in. and larger.....	3.40c
Smooth fln-h. 1 to 2 1/4 x 1/4 in. and larger.....	3.75c

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.....	\$3.00 to \$3.25
Scrap T rails.....	2.50 to 2.75
Machine shop turnings.....	0.80 to 1.00
Cast iron borings.....	1.05
Bundled skeleton, long.....	2.00 to 2.10
Forge flashings.....	3.00 to 3.50
Blast furnace scrap.....	0.90 to 1.00
Forge scrap.....	3.00 to 3.25
Shafting.....	2.50 to 10.00
Steel car axles.....	9.00 to 9.50
Wrought pipe.....	4.00 to 4.25
Rails for rolling.....	4.50 to 5.00
Cast iron borings, chemical.....	7.00 to 7.25
Per gross ton delivered consumers' yards:	
Textile cast.....	\$7.00 to \$7.50
No. 1 machinery cast.....	7.50 to 8.00
Store plate.....	5.00 to 5.25
Railroad malleable.....	8.00 to 8.50

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel.....	\$6.00 to \$6.50
Scrap rails for melting.....	6.00 to 6.50
Loose sheet clippings.....	1.50 to 2.00
Bundled sheets.....	3.75 to 4.25
Cast iron borings.....	3.25 to 3.75
Machine shop turnings.....	3.00 to 3.50
No. 1 busheling.....	4.50 to 5.00
No. 2 busheling.....	2.75 to 3.25
Rails for rolling.....	6.50 to 7.00
No. 1 locomotive tires.....	7.50 to 8.00
Short rails.....	9.00 to 9.50
Cast iron car wheels.....	6.50 to 7.00
No. 1 machinery cast.....	8.25 to 8.75
No. 1 railroad cast.....	7.75 to 8.25

ST. LOUIS

Open hearth spring steel, bases.....	
4 1/2 to 7.00c.....	4.50c to 7.00c
Common wire nails, base, per keg.....	\$2.60
Machine bolts, cut thread:	
3/4 x 6 in. and smaller.....	65 to 65 and 10
1 x 30 in. and smaller.....	65 to 65 and 10
Carriage bolts, cut thread:	
3/4 x 6 in. and smaller.....	65 to 65 and 10
3/4 x 20 in. and smaller.....	65 to 65 and 10
Bolter tubes.....	
Lan welded, 2-in.....	\$1.95
Seamless welded, 2-in.....	19.24
Charcoal iron, 2-in.....	24.91
Charcoal iron, 4-in.....	63.65
*No. 28 and lighter, 36 in. wide, 20c higher per 100 lb.	

ST. LOUIS

Base per lb.	
Plates and struc. shapes.....	3.25c
Bars, soft steel or iron.....	3.00c
Cold-fn. rounds, shafting, screw stock.....	
Hot-rolled annealed sheets (No. 24).....	3.80c
Galv. sheets (No. 24).....	4.35c
Hot-rolled sheets (No. 10).....	3.45c
Black corrug. sheets (No. 24).....	3.85c
Galv. corrug. sheets.....	4.40c
Structural rivets.....	4.00c
Boiler rivets.....	4.00c
Per Cent Off List	
Tank rivets, 3/4 in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	70
Carriage bolts.....	70
Lag screws.....	70
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more.....	70
Less than 200 lb.....	60
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more.....	70
Less than 200 lb.....	60

PHILADELPHIA

Base per lb.	
*Plates, 3/4 in. and heavier.....	2.10c
*Structural shapes.....	2.10c
*Soft steel bars, small shapes, iron bars (except bands).....	2.10c
Reinforce. steel bars, sq., twisted and deformed.....	2.30c
Cold-fn. steel, rounds and hex.....	3.35c
Cold-fn. steel, sq. and flats.....	3.85c
*Steel hoops.....	2.65c
*Steel bands, No. 12 to 3/16 in. incl.....	2.40c
Spring steel.....	5.00c
Hot-rolled annealed sheets (No. 24).....	3.55c
Galvanized sheets (No. 24).....	3.75c
*Hot-rolled and annealed sheets (No. 10).....	2.55c
Diam. pat. floor plates, 3/4 in.....	5.00c
Swedish iron bars.....	5.60c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices for 15,000 lb. orders; extra apply for smaller quantities.

CLEVELAND

Base per lb.	
Plates and struc. shapes.....	2.95c
Soft steel bars.....	2.75c
Reinforce. steel bars.....	1.75c to 1.95c
Cold-fn. rounds and hex.....	2.95c
Cold-fn. flats and sq.....	3.45c
Flat rolled strip.....	3.00c
Cold-finished strip.....	5.55c
Hot-rolled annealed sheets (No. 24).....	3.25c
Galvanized sheets (No. 24).....	3.75c
Hot-rolled sheets (No. 10).....	3.00c
Black ann'd wire, per 100 lb.....	\$2.75
No. 8 galv. wire, per 100 lb.....	2.20
Com. wire nails, base per keg.....	2.35
*Net base, including boxing and cutting to length.	

CINCINNATI

Base per lb.	
Plates and struc. shapes.....	3.25c
Bars, soft steel or iron.....	3.00c
New billet reinforce. bars.....	3.00c
Rails steel reinforce. bars.....	3.00c

Burnt cast.....	4.25 to 4.75
Stove plate.....	4.25 to 4.75
Agricultural malleable.....	7.75 to 8.25
Railroad malleable.....	8.25 to 8.75

DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting steel.....	\$5.25 to \$5.75
Borings and short turnings.....	3.00 to 3.50
Long turnings.....	2.50 to 3.00
No. 1 machinery cast.....	7.75 to 8.25
Automotive cast.....	8.00 to 8.50
Hydraulic comp. sheets.....	5.00 to 5.50
Stove plate.....	2.75 to 3.25
New No. 1 busheling.....	4.50 to 5.00
Old No. 2 busheling.....	2.50 to 3.00
Sheet clippings.....	1.75 to 2.25
Flashings.....	3.75 to 4.25

CANADA

Dealers' buying prices per gross ton:		Toronto Montreal	
Heavy melting steel.....		\$7.00	\$6.00
Rails, scrap.....		7.00	8.00
No. 1 wrought.....	6.00		8.00
Machine shop turnings.....	5.00		2.00
Roller plate.....	2.00		4.50
Cast axle turnings.....	2.50		2.50
Cast borings.....	2.00		2.00
Cast borings.....	2.00		2.00
Wrought pipe.....	2.00		2.00
Steel axles.....	7.00		
Steel axle, wrought iron.....	11.00		
No. 1 machinery cast.....	12.50		10.00
Store plate.....	10.00		8.00
Standard carwheels.....	10.00		8.50
Malleable.....	10.00		8.00

We Must Stand Together

By GEORGE M. VERITY

Chairman of the Board, American Rolling Mill Co.
Middletown, Ohio

THE great national political controversy, which we must go through every four years, and which has raged so vigorously for the past three months, has come to an end.

A new commander-in-chief, eager to take up the growing burdens of this great office, has now been chosen. He has pledged the nation his best effort in the solution of our problems, and in working for the progress necessary to the happiness and development of a forward looking people.

It is therefore our duty as loyal Americans to get behind this new administration and give every sound and constructive measure it proposes, in the solution of our many complex problems, our full support.

Only by so doing can we serve our

own best interests, as we must remember that we are still in the midst of a great economic upheaval, which can only be righted by the coordinated effort of our Government and our people.

To withhold our support and cooperation through bitterness, resentment, disappointment, or otherwise, would only result in creating greater uncertainty and in unnecessarily prolonging the period of recuperation which has already been as costly as our people and our institutions can stand, without a serious weakening of our whole financial, industrial and commercial structure.

The will of a free people must in the end be served by their administrators and the work and service of any

particular group is of short duration. Only by concerted and cooperative effort can that will be so strongly visualized that the administrators of government, whoever they may be, are certain to understand it.

There certainly never was a time when the convictions of so large a number of our people were so pronounced. These tragic times have made us all think as never before, but no matter what our convictions or which side we supported right up to the voting booth, the verdict of a majority is recorded, and there can be no stable government unless that majority is recognized and supported by every loyal citizen.

As representative of all political parties and of all the faiths that abound among our people, let us now stand shoulder to shoulder in a gigantic and irresistible effort in the support of government and business and of all our established institutions, in the complete rehabilitation and reinvigoration of the greatest of all free nations, to the end that unemployment may disappear and happiness and prosperity may return to the American home.

Continental Steel Bookings Increasing; Prices Higher

British Pig Iron Trade Also More Active—Talk of Higher Tin Plate Prices

LONDON, ENGLAND, Nov. 14 (By Cable).—Pig iron demand in Great Britain is broadening. Producers of semi-finished steel are securing orders previously diverted to the Continent, but finished steel business is slow.

Tin plate activity is well maintained, and makers have good bookings. There is talk of higher plate prices because of firmer tin and prospects that semi-finished steel will be dearer. Tin plate recently offered at below 16s. per base box, f.o.b. works port, is now all sold or sellers have withdrawn the offers. South Africa is buying galvanized sheets, but Indian business is awaiting ratification of Ottawa agreements by the Indian Government. Japan has made further purchases of thin black sheets, making recent total purchases more than 2000 tons.

United Kingdom pig iron exports in October were 7500 tons, of which only 40 tons were shipped to the United States. Total October exports of all kinds of iron and steel were 160,000 tons.

Continental steel works report increased bookings, and Luxemburg mills are sold up to the middle of January. There have been good or-

ders from South America and China and good inquiries from Scandinavia and Holland. Continental business with the United Kingdom is slack.

German pig iron producers have reduced domestic prices by six marks for six months to meet competition of United Kingdom furnaces.

Turkey is proposing to erect a nail and wire mill.

British steel prices are unchanged, but some Continental gold prices have again advanced.

Pruyn Ball Bearing Works, 4410 Paul Street, Philadelphia, and the Pruyn Bearings Co., 685 North Broad Street, Philadelphia, subsidiaries of the Pruyn Co. of America, are about to locate general offices and works at 1714 Fairmount Avenue. These companies specialize in bearings and especially the regrinding of worn ball bearings.

Marks of origin on iron and steel hollow ware imported into Great Britain have been recommended by the standing committee of the British Board of Trade. Hollow ware recommended for marking includes: Plain, galvanized, tinned, japanned, painted, lacquered or varnished; but not hollow ware of tin plate, enameled hollow ware, or kegs and drums, nor hollow ware imported as part of another article.

Twelve railroad locomotives were shipped in October, a decline of one from September, according to reports received by the Bureau of the Census from the principal manufacturers.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hearth	£11 7s.	6d. to	£5 7s. 6d.
Black sheets, Japanese specifications	£10 15s.		
Tin plate, per base box	16s.	to	16s. 3d.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hearth	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£8 5s.		
Galvanized sheets, No. 24 gage	£10 15s.		

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86

Billets, Thomas	£2 3s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Black sheets, No. 31 gage, Japanese	£11 5s.		
Steel bars, merchant	£3	to	£3 2s. 6d.
Beams, Thomas	£2 9s.	to	£2 10s.
Angles, Thomas, 4-in. and larger	£2 17s. 6d.		
Angles, small	£3 2s.		
Hoops and strip steel over 6-in. base	£3 10s.	to	£3 10s. 6d.
Wire plain, No. 8	£5 7s. 6d.		
Wire nails	£5 10s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

Advocate Coarse Grain Steel for Gear Forgings

(Concluded from Page 755)

cut. The improvement in machinability amounted to 50 to 400 per cent. Speeds and feeds were increased 11 to 60 per cent and tool life increased in like proportion. As an example, the accompanying table compares machining results with those obtained on the old-type gears. The comparison is offered to show the value of purchasing the steel on grain-size specification and a forging practice to develop increased density.

Another point emphasized by the authors is that the denser forgings have proved highly responsive to the hardening treatment, resulting in uniform distortion. Dynamometer tests run for durability, they add, have shown that the life of the gears has been increased more than 50 per cent, with marked decrease in pitting and granulations, the maintenance of smoother surfaces and quieter operation.

Machinability of Gear Forgings

Part Name	Pieces per Shift of Hob	
	December, 1931	A Year Ago
M. D. gear.....	35	27
Idler (15-tooth).....	120	65
Idler (19-tooth).....	64	58
Second-speed.....	35	24
Sleeve.....	14	8 to 10
Low slider.....	70	60
Cluster (17-tooth).....	35	20
Cluster (15-tooth).....	90	52
Cluster (20-tooth).....	30	20

With the exception of the 15- and 19-tooth gears, all are finished in one cut with 0.060 in. feed per revolution of blank. The overall tool cost of the plant per job has been reduced from 84c. to 44c. within the last year.

Controlling Operation of Steckel Mills

(Concluded from Page 757)

sion decreases, the operation is opposite. Thus the actual tension in the strip is weighed and regulators maintain the desired back tension within very narrow limits. The operation of this mill is controlled through a rheostat of the same general construction as explained for the small mills, and in much the same manner.

A mechanical arrangement has been proposed whereby only one driving motor is required. The arrangement is practically the same as that for the smaller mills, previously described, except the pinion is placed between the main gears. This makes it necessary to reverse the driving motor to change the direction of rolling.

The main rheostat will be, therefore, of the reversing potentiometer type. Dynamic braking will be used to stop the motor quickly in case the strip breaks. This is not such an essential feature on the smaller drive because the stored energy of the motor is not great. In all other features the

proposed main electrical equipment will be practically the same as for the smaller mills previously described.

As pointed out before, regenerative braking may prove economical on the large drives, and a scheme has been laid out employing drag generators, regulators, etc., for obtaining constant back tension electrically. A detailed consideration of this equipment will be of greater value after actual operating experience has been obtained.

Thus, summing up, it will be seen that the outstanding requirements of the electrical equipment for Steckel mills are smoothness of operation, ease of manipulation and simplicity.

Segregation of Ferrite and Cementite from Austenite

The report of Dr. R. F. Mehl, newly appointed director of the Bureau of Metallurgical Research of Carnegie Institute, on his pioneering study of the mechanism of phase change was received with keen interest at the recent open meeting of the Metallurgical Advisory Board of the Carnegie Institute of Technology at Pittsburgh.

Without dwelling upon the details of technique in this specialized field of investigation, Dr. Mehl ably presented the high spots in the development of Widmanstätten structures in the iron-carbon system as revealed in his work in collaboration with Drs. C. S. Barrett and D. W. Smith. It was found that the orientation of the separating phase with respect to the parent phase in both quenched and slowly-cooled hypo- and hyper-eutectoid iron-carbon alloys depended only on the relationship existing between gamma and alpha iron on the basis of minimum displacement of atoms in the lattice. Slowly cooled hyper-eutectoid steels constitute an exception because the crystal structure of the precipitated phase is a factor. The applications of etch-pits, plate angles, and X-ray data offered interesting illustrations of the procedure. The authors emphasized the significance of such studies in determining the mechanism of age hardening.

Exact understanding of the general mechanism of precipitation of excess phases from supersaturated solid solutions, wrote E. C. Bain, metallurgist, U. S. Steel Corp., Research Laboratories, Kearny, N. J., is of great importance in the control of commercial alloys. The generality of the behavior is evidenced by the similarity in the precipitation of ferrite in the slowly-cooled samples at high temperatures with that of the rapid formation of martensite at much lower temperatures. Belief was expressed that rate of reaction may be a major factor in determining structural differences in normal and abnormal steels of very nearly the same compositions. As particle size and distri-

bution are frequently more influential factors than the actual amounts of the various phases in an alloy, study of the mechanism of transformation may well be more profitable than mere investigation of the limits of solid solubility.

New Trade Publications

Diesel Engines.—Caterpillar Tractor Co., Peoria, Ill. Attractive booklet describing features of the D-9900 engine. Specifications and foundation layout are included.

Oildag Lubricant.—Acheson Oildag Co., Port Huron, Mich. Technical bulletin No. 113.3, entitled: "Importance of Colloidal Graphite Lubricants in 'Running In' Operations."

Power Squaring Shears.—Niagara Machine & Tool Works, Buffalo. Bulletin No. 72-D, 32 pages, devoted to series 300, 600, 700 and 800 E and F shears, with capacities of 1/4 in. soft steel and lighter.

Relief Valves.—Schutte & Koerting Co., Twelfth and Thompson Streets, Philadelphia. Leaflet devoted to a pressure-relief and back-pressure valve equipped with a compensator to improve pressure regulation, particularly in fuel oil and lubricating oil systems.

Fireproof Construction.—Modern Fireproof Construction Co., 4417 North Sixth Street, Philadelphia. Fully illustrated pamphlet devoted to the Pawling system, covering improvements since it was described in THE IRON AGE of Nov. 13, 1930. The text, which explains at some length the arc welded steel joist and the use of metal lath of Pawling design, is supplemented by drawings and photographs of installations in a wide range of types of buildings.

Constant Tension Drive.—Reliance Electric & Engineering Co., Cleveland. Bulletin No. 602, devoted to a regulator for maintaining a constant tension in a material being wound or unwound. The apparatus is particularly important in the rolling of strip steel. The problem met by the regulator is this: As the coil builds up, layer upon layer, the diameter of the coil increases, yet there is a fixed linear speed of the strip steel as it is delivered through the working rolls of the mill; hence the motor that drives the coiler must take care of the changing speed of the coil to maintain at the same time the requirement of constant tension.

Cold Rolling.—United Engineering & Foundry Co., Pittsburgh. Bulletin P-202, showing in 36 profusely and artistically illustrated pages a large number of installations for rolling strip steel and also non-ferrous products. Particulars are given about every installation, and the text matter points out the scope of the problems and what has to be watched to gain success.

Edge Tools.—Oxford Tool Co., 180 West Oxford Street, Philadelphia. Catalog 22 pages, with dimensional and other data on cold chisels, stone drills, punches, automobile tools, scrapers, caulking and other tools.

Fluid Meters.—Bailey Meter Co., Cleveland, has issued an attractive 24-page bulletin, No. 300, describing the new line of Bailey fluid meters now available. This bulletin describes and illustrates the several types of meters which can be furnished, pointing out the many distinctive features which make the new line of meters outstanding. Other sections of the bulletin deal with the application and methods of installation of the equipment. Numerous illustrations are included, comprising detailed drawings, diagrammatic sketches, equipment photographs, installation photographs, and chart reproductions in four colors.

"A Study of the Embrittlement of Hot-Galvanized Structural Steel," an investigation sponsored by the American Society for Testing Materials at the Batelle Memorial Institute, is recently off the press in pamphlet form as a reprint from the *Proceedings* of the A.S.T.M. It offers recommended practice for safeguarding against embrittlement of such products and procedure for detecting embrittlement.

PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Sales Lower in October

Decline Follows Two Months of Increase
—Automobile Manufacturer to
Place Large Orders

FOLLOWING a consecutive rise of machine tool sales for two months, the volume of business fell off slightly in October, according to the monthly report of the National Machine Tool Builders' Association, whose index figure on sales for last month is 27.4, against 29.4 for September and 28.3 for August. The decline in business last month was almost wholly due to the fact that less foreign business was booked than in September.

The association's three-months' moving average has risen slightly to 28.3 from 27.7 at the end of the preceding month. Unfilled orders rate 39.9, compared with 59.6 the month before, while October shipments are at 44.4, against 42.5 in September.

This month's aggregate orders may be swelled, however, by a substantial amount of buying to be done by a large automobile manufacturer. Purchases will include drilling, tapping and grinding machines, and may ag-

gregate several hundred thousand dollars in value.

The Committee on Industrial Rehabilitation is beginning to obtain concrete results in promises of definite modernization programs, though purchases of machinery have not yet been made in any volume.

The American Sheet & Tin Plate Co. has bought some of the equipment required for a modernization program at Vandergrift, Pa., but the more important items are still to be ordered.

◀ NORTH ATLANTIC ▶

Sinclair Refining Co., 45 Nassau Street, New York, will carry out expansion and improvements at oil refinery at Fort Worth, Tex., including new units for gasoline production, bulk storage and distributing service, and other divisions. Cost over \$600,000 with equipment. H. T. Dinkins is district manager at Fort Worth.

Superintendent of Lighthouses, Staten Island, N. Y., asks bids until Nov. 21 for 13 bell buoys, 30 riveted type can and nun buoys, 383 welded type buoys, all steel plate construction with bottom counterweight; also for 275 cast iron sinkers and balls from 120 to 8500 lb. each, with forging cast in, total weight about 976,000 lb. (Proposal 41722).

Board of Trustees, St. Joseph's Hospital, Far Rockaway, L. I., has revised plans for one-story workshop and mechanical service building. Cost over \$60,000 with equipment. Bids recently received have been rejected. Henry V. Murphy, 208 Livingston Street, Brooklyn, is architect.

Van Britton, Inc., New York, has been organized by Frank Silverman, 410 Ocean Parkway, Brooklyn, and associates, to manufacture razors, razor blades and kindred products.

General Electric Co., Schenectady, N. Y., is increasing production schedule for new oil furnace units and other air-conditioning equipment, adding to working quota.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for one locomotive type fire-tube boiler, 100 hp. (Schedule 9096) for naval aircraft station, Lakehurst, N. J.

Todd Dry Dock, Engineering & Repair Corp., foot of Twenty-third Street, Brooklyn, has plans for one-story shop and storage addition, 67 x 72 ft. Cost over \$24,000 with equipment. Adolph Goldberg, 164 Montague Street, is architect.

G. T. Abel & Co., Inc., New York, has been organized by Gerard T. Abel, 8902 Ninety-seventh Street, Woodhaven, L. I., and associates to manufacture boilers and kindred equipment.

Colonial Radio Corp., 444 Madison Avenue, New York, manufacturer of radio equipment, parts, etc., with plants at Long Island City and Rochester, N. Y., has arranged for increase in capital from \$540,000 to \$1,540,000 for expansion.

United States Neon Corp., Newark, N. J., has leased part of building at 116 Sussex Avenue, for new plant for manufacture of electric signs and displays.

Passaic Economy Iron Works, Inc., Passaic, N. J., care of Louis J. Razen, 12 Lexington Avenue, representative, has been organized by Morris Goffman, Passaic, and associates, capital \$100,000, to manufacture ornamental and other iron products. Property has been leased

at East Rutherford, N. J., for new plant and work will soon begin.

Bamberger Broadcasting Service, 147 Market Street, Newark, operating Station WOR, has secured permission to erect new broadcasting plant at Tremley, near Rahway, N. J., increasing operating power from 5000 to 50,000 watts, with steel towers, antenna, power station and other structures. Cost over \$75,000.

Sun Tube Co., Long Avenue, Hillside, Newark, manufacturer of collapsible metal tubing, etc., has filed plans for one-story addition, 60 x 180 ft. Cost close to \$50,000 with equipment.

Hatfield Wire & Cable Co., Hillside, Newark, manufacturer of insulated electrical wires, cables, etc., is running on full time schedule, with overtime night force in number of departments. Company has recently increased working force. Operations are also being advanced at branch plant at Hackettstown, N. J.

Metal Cone Mfg. Co., Inc., 124 Myrtle Avenue, Jersey City, N. J., has purchased two-story factory at 12-16 Bayview Avenue, on site 75 x 110 ft., for expansion.

Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Nov. 21 for aluminum alloy machine screws and aluminum alloy wood screws (Aero Req. 765), 25,000 plain steel washers, 8000 flat steel washers and 2500 steel bevel washers (Aero Req. 764), 59 test stands, radio generator, etc. (Eng. Req. 530).

Constructing Quartermaster, Carlisle Barracks, Carlisle, Pa., asks bids until Dec. 7 for power house for central steam heating service.

Sinclair Refining Co., Marcus Hook, Pa., plans extensions and improvements in local oil refinery. Cost close to \$100,000 with equipment. Company headquarters are at 45 Nassau Street, New York.

School Building Commission for Milton District, office of Delaware School Foundation, 4130 duPont Building, Wilmington, Del., asks bids until Nov. 23 for manual training equipment for school at Milton, Del. Joseph M. Lank is chairman.

Post Index Co., Jamestown, N. Y., manufacturer of Metal card-filing devices and equipment, and its subsidiary, Art Metal Construction Co., same place, manufacturer of steel and bronze interior equipment for banks, etc., are arranging for operation of joint fabricating plant at Toronto, Ont.

Syracuse Chilled Plow Co., 111 Wyoming Street, Syracuse, N. Y., has resumed operations at foundry and shops on five-day week basis, following shut down for two months, reinstating about 75 men. Company is a subsidiary of Deere & Co., Inc., Moline, Ill.

Sayre-Hanna Engineering Corp., Syracuse, N. Y., has been organized by Gordon B. Sayre, 305 Scotchholm Terrace, and Charles G. Hanna, 160 Winkworth Drive, capital \$100,000, to manufacture electric heaters and parts, and kindred equipment.

◀ CENTRAL DISTRICT ▶

Quaker State Oil Refining Corp., Oil City, Pa., has plans for addition to refinery at Farmers Valley, Pa., including new unit for production of gasoline. Cost over \$350,000 with machinery.

Wendell August Forge Co., Grove City, Pa., manufacturer of aluminum forgings, etc., has advanced production schedule to 60 hr. a week, and is adding to working force.

Harrison Board of Township Commissioners, Cyrus E. Miller, township engineer, 41 Chestnut Street, Natrona, Pa., asks bids until Nov. 21 for one vertical centrifugal non-clogging motor-driven pumping unit with accessories, capacity 500 gal. a min. for pumping plant at Tarentum, Pa.

Fretz-Moon Tube Co., Butler, Pa., manufacturer of seamless steel tubing, has let general contract to Rust Engineering Co., Koppers Building, Pittsburgh, for one-story addition, 30 x 70 ft. Cost about \$50,000 with equipment.

Page Steel & Wire Co., Monessen, Pa., will start production in December on wire and cable for Golden Gate Bridge, San Francisco, for which company secured order totaling close to \$6,000,000 several weeks ago.

Metal Package Corp., McKeesport, Pa., a subsidiary of McKeesport Tin Plate Co., same place, has secured contract from Edward G. Ruff Cannery, Bryansville, Pa., for tin plate for can manufacture, totaling over \$125,000.

Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated boxes and containers, is resuming production at No. 3 mill, following shut down for several years, and will reinstate large working force.

General Electric Co., 4966 Woodland Avenue, Cleveland, and Schenectady, N. Y., has awarded general contract to S. W. Emerson Co., 1836 Euclid Avenue, for improvements in four-story equipment storage and distributing plant, address first noted. Cost about \$40,000.

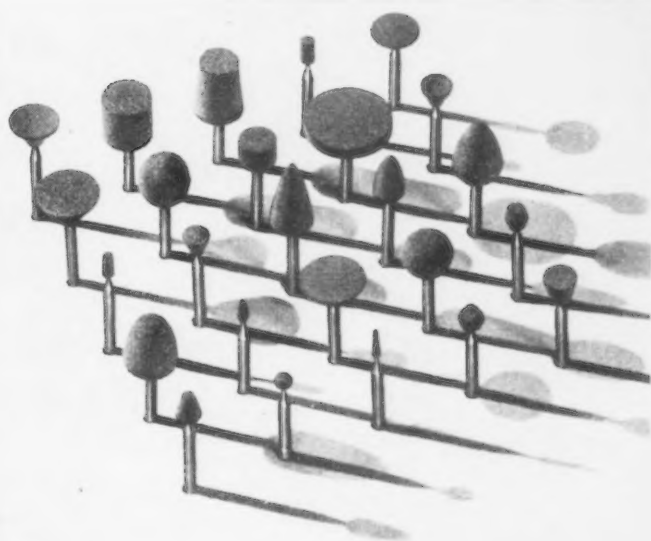
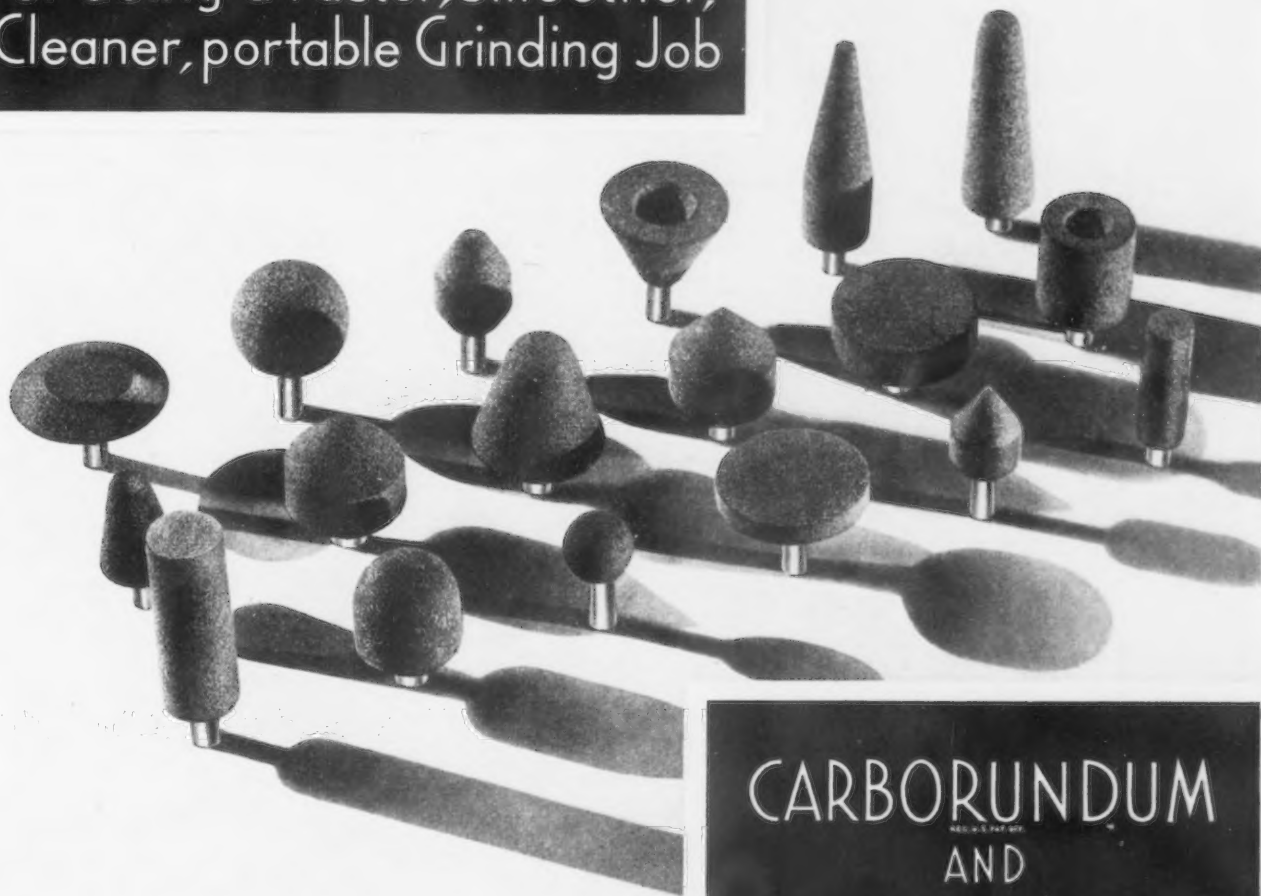
Industrial Appliances, Inc., Sandusky, Ohio, has been organized by Russell A. Ramsey, 801 Feick Building, and associates to manufacture industrial equipment and appliances.

Mullins Mfg. Corp., Mill Street, Salem, Ohio, manufacturer of metal stampings for automobile bodies, fenders, etc., is advancing production schedule in tool department and will make additions to working force; operations will soon be increased in other divisions. Company has just secured order for automobile equipment totaling about \$400,000.

Heekin Can Co., 435 New Street, Cincinnati, manufacturer of tin cans, will remodel factory on East Sixth Street, for expansion in manufacturing.

Belmont Stamping & Enameling Co., New Philadelphia, Ohio, has resumed production in press department, after curtailment for several weeks, recalling about 80 men; company will

For doing a Faster, Smoother,
Cleaner, portable Grinding Job



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CANADIAN CARBORUNDUM CO., LTD., NIAGARA FALLS, ONT.

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(CARBORUNDUM AND ALOXITE ARE REGISTERED TRADE MARKS OF THE CARBORUNDUM COMPANY)

soon reopen enameling division, giving employment to 150 additional men.

Contracting Officer, Materiel Division, Wright Field, Dayton, Ohio, asks bids until Nov. 22 for one standard signal generator (Circular 216); until Nov. 23, 300 landing gear rear strut balls (Circular 223); about 550 pairs of adjustable dies (Circular 209); until Nov. 28, sheet and bar steel (Circular 213); 190 gun mount assemblies (Circular 210); until Nov. 29, lock pins (Circular 219), aluminum bar, aluminum tubing, aluminum welding rods, aluminum alloy sheets, bars and tubing (Circular 212), 140 external parachute flare rack assemblies (Circular 217); until Dec. 5, bronze castings, bronze rods and bronze strips (Circular 215), brass rods, brass sheets, brass wire, brass tubing, copper sheets, copper tubing and copper wire (Circular 220).

Camel Rubber Co., Akron, Ohio, has been organized by Lloyd K. and Charles L. Heckman, P. O. Box 176, Ellet, Ohio, to manufacture rubber products.

New York Central Railroad Co., New York and Indianapolis, is planning increased production schedule, primarily for steel car repair and construction at Big Four shops at Beech Grove, Indianapolis, and will reinstate large number of men.

Finnell Rotary Stokers, Inc., Elkhart, Ind., has been organized by Gerald Mahoney and James R. Nyce, Elkhart, to manufacture stokers and kindred power plant equipment.

Village Council, Frankfort, Mich., is considering erection of a municipal electric light and power plant. Cost over \$50,000 with equipment.

Amplex Mfg. Co., 7900 Joseph Campau Avenue, Detroit, manufacturer of bearings and kindred mechanical automobile equipment, will carry out expansion and improvements, to cost about \$50,000 with equipment. Company is a subsidiary of Chrysler Corp., 341 Massachusetts Avenue.

Sturgis Die & Tool Co., Sturgis, Mich., recently organized by W. E. Kline, mechanical engineer, and associates, has taken over former local plant of Sturgis Go-Cart Co., for manufacture of tools, dies and kindred specialties.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, is advancing operations at different plants and will recall about 600 men. During past month company has employed over 3000 men on full time six-day week.

American Store Equipment Co., 5235 Grand River Boulevard, Detroit, has been organized by Ira Copeland and associates to manufacture show cases and store fixtures.

General Motors Corp., Detroit, will increase production facilities at Walkerville, Ont., plant, where Pontiac automobiles will be produced for Canadian trade, including parts manufacture and assembling. Walkerville plant has been used largely for production of Chevrolet automobiles.

Kunkle Mfg. Co., Hart, Mich., manufacturer of automobile heaters and heating equipment, has adopted a capacity schedule with full working force. Large part of output will be given over to new line of heating units for Ford automobiles.

Republic Lead Equipment Co., 3184 West Forty-first Street, Cleveland, has succeeded to business of Gross Lead Burning & Coating Corp., same city, and will continue lines of work done by Gross company, namely manufacture of lead equipment of all types.

◀ SOUTH ATLANTIC ▶

Industrial Paint & Varnish Co., 3200 East Biddle Street, Baltimore, manufacturer of paints, oils, varnishes, etc., has let general contract to George L. Schnader, 3111 Berkshire Road, for plant extensions and improvements. Cost over \$26,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for steel caisson for dry dock at Norfolk, Va., Navy Yard (Specification 6967).

Seaboard Air Line Railway Co., Portsmouth, Va., has advanced operations from four to five-day week basis at locomotive and car repair shops at Hermitage, Va., giving employment to about 150 men.

J. W. Davis, Statesboro, Ga., is at head of project to erect a meat-packing plant; initial unit to cost close to \$25,000 with equipment.

Procurement Division, Veterans' Administration, Washington, asks bids until Nov. 23 for one 4000-lb. truck with dump body and hydraulic hoist (Proposal 207-M); three laboratory balances, three sets balance weights, etc. (Proposal 276).

Rail & River Coal Co., Wheeling, W. Va., is arranging for resumption of operations at two of coal-mining properties, reinstating about 1000 men.

Southeastern Anthracite Co., Sanford, N. C., H. O. DeBeek, head, will carry out expansion and improvements at Gardner coal mining properties, including installation of crusher rolls and other equipment.

City Council, Sanford, N. C., plans installation of pumping machinery and other equipment in connection with new filtration plant at municipal waterworks. Funds of \$45,000 has been secured for work.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 22 for 55,000 lb. welding electrode (Schedule 9071); until Nov. 29, 53 air and liquid bottles for hydraulic equipment (Schedule 9093) for Norfolk, Va., Navy Yard; until Nov. 22, one motor-driven drill grinder (Schedule 9058); until Nov. 29, one motor-driven precision bench lathe (Schedule 9064), 325,000 lb. galvanized corrugated sheet steel (Schedule 9102), one 100-hp. electric motor (Schedule 9076), 12 air compressors and spare parts (Schedule 9016), 47 electric arc welding sets (Schedule 9118), anchors and thimbles, shackles, wire rope, etc. (Schedule 9099) for Eastern or Western navy yards; 180 electric generator equipments (Schedule 9077), bare resistance wire (Schedule 9101) for Brooklyn and Mare Island navy yards; one vertical boiler (Schedule 9091) for Sewall's Point, Va., Navy Yard.

Piedmont Auto Exchange, Charlotte, N. C., Robert W. Buckley, head, will install machine shop on third floor of new three-story automobile building, 55 x 200 ft., to be erected on North Church Street. List of tools and equipment is being arranged. Entire cost over \$70,000.

◀ MIDDLE WEST ▶

Faith Mfg. Co., 5920 North Crawford Avenue, Chicago, manufacturer of die castings, automobile radiator caps, etc., has purchased part of property of Tallman Brass & Metal Co., Hamilton, Ont., for a Canadian branch plant for production of its specialties. Alexander F. Cardinas will be in charge.

Ward Machinery Co., Inc., 564 West Washington Street, Chicago, has been organized by William Ward and Peter M. Munn, to manufacture machinery and parts.

Minnesota Mining & Mfg. Co., 791 Forest Street, St. Paul, manufacturer of abrasive products, has awarded general contract to William M. Murphy & Son, Pioneer Building, for two two-story top additions, each about 46 x 152 ft., to buildings Nos. 2 and 3, respectively. Cost over \$40,000 with equipment. Toltz, King & Day, Inc., Builders' Exchange Building, is architect and engineer.

City Council, Corning, Iowa, has been authorized to arrange for erection of a municipal electric light and powerplant. Cost about \$160,000 with equipment. Vincent J. Mack is city clerk, in charge.

Theodore Hamm Brewing Co., St. Paul, is planning expansion and improvements, including installation of kettles, conveyors, automatic bottling and other mechanical equipment. Cost over \$400,000, about one-half of which will be used for equipment purchases. William Hamm, Jr., is president.

Homestake Mining Co., Lead, S. D., operating gold mining properties, has work under way on new cyanide metallurgical plant. Cost over \$200,000 with machinery. Plant is scheduled to be ready for service early next year.

Kelpo Clutch Co., 216-18 Mill Street, Rockford, Ill., has been organized by E. E. Woodward and F. S. Douglass, Rockford, to manufacture clutches and other mechanical equipment.

Ford Motor Co. has discontinued assembling operations at Milwaukee, and will concentrate production for this district at assembling plant on Torrence Avenue, Chicago, for indefinite period.

Common Council, Marion, Iowa, has engaged H. R. Green Co., 417 First Avenue, S. E., Cedar Rapids, Iowa, consulting engineer, to make surveys and estimates of cost for a municipal gas plant.

Twin Lakes Reservoir & Canal Co., Olney Springs, Colo., plans installation of power and pumping machinery, and other mechanical equipment, pipe lines, etc., in connection with expansion and improvement program for increased water supply. Company has secured loan of \$1,125,000 for project.

Western Foundry Co., 3634 South Kedzie Avenue, Chicago, manufacturer of metal castings, has advanced operations and added to

working force. During past four months production has been increased close to 150 per cent.

National Enameling & Stamping Co., Milwaukee, will invest \$10,000 in Milwaukee, \$12,000 in Granite City, Ill., and \$3,000 in Baltimore for new equipment.

Marinette & Menominee Box Co., Marinette, Wis., plans rebuilding of wire-bound box and crating factory destroyed by fire Nov. 10, with loss about \$175,000.

Capitol Fence Co., 215 South Dickinson Street, Madison, Wis., has been organized by Milwaukee and Madison capital and is establishing plant in Madison principally for production of snow fencing, requiring considerable quantities of galvanized, copper-bearing wire. Later it is planned to manufacture steel fencing. James A. McCall is general manager.

B. Ulrich Lock & Key Co., 844 North Third Street, Milwaukee, has received order from distributing interest at Rochester, N. Y., for nickel bead key chains numbering 2,190,000 units, requiring capacity operations for four months, commencing Nov. 20.

Heil Co., 3000 West Montana Street, Milwaukee, manufacturer of steel motor truck bodies, hydraulic hoists, oil burners, dehydrators, pumps, etc., has let contract to Klug & Smith Co., 111 East Wisconsin Avenue, for one-story and basement addition, 30 x 120 ft. to testing room. Julius P. Heil is president.

Pabst Corp., 917 West Juneau Avenue, Milwaukee, is remodeling a manufacturing unit at 944 West Bruce Street, for purposes of Solar Corp., Beaver Dam, Wis., manufacturer of storage batteries, paints and lacquers, etc., which will consolidate operations of plants in Beaver Dam and Minneapolis, in Milwaukee some time in December.

◀ SOUTH CENTRAL ▶

United States Engineer Office, Vicksburg, Miss., asks bids until Nov. 23 for 40 cast bronze worms and 40 cast steel worm gears (Circular 37).

Board of Education, Louisville, will install manual training department in new multi-story senior and junior high school, for which general contract has been let to George H. Rommel Co., 958 Logan Street. Cost \$600,000 with equipment. J. Meyrick Colley, 1814 South First Street, is architect; Warren & Ronald, Heyburn Building, are consulting engineers.

Mississippi Pulp Corp., Natchez, Miss., has purchased local plant of Mississippi Match Co., from Irving Trust Co., New York, receiver for International Match Co., owner of property, and will improve for new pulp mill unit.

United States Engineer Office, Louisville, asks bids until Dec. 7 for new lock and dam No. 5, Green River, near Bowling Green, Ky., including lock gates and operating mechanism, valves and other mechanical equipment. Appropriation of \$970,000 has been arranged for work.

Jefferson Lake Oil Co., Lake Peigneur (Iberia Parish), La., is planning to increase production schedule at new sulphur plant, recently placed in operation, from 150,000 to 250,000 tons a year. Four new wells will be equipped and placed in service.

◀ NEW ENGLAND ▶

Knox Varnish Co., 80 Freeport Street, Dorchester, Mass., has awarded general contract to C. C. Temple Co., 2 Park Square, Boston, for new one-story plant. Cost about \$25,000 with equipment.

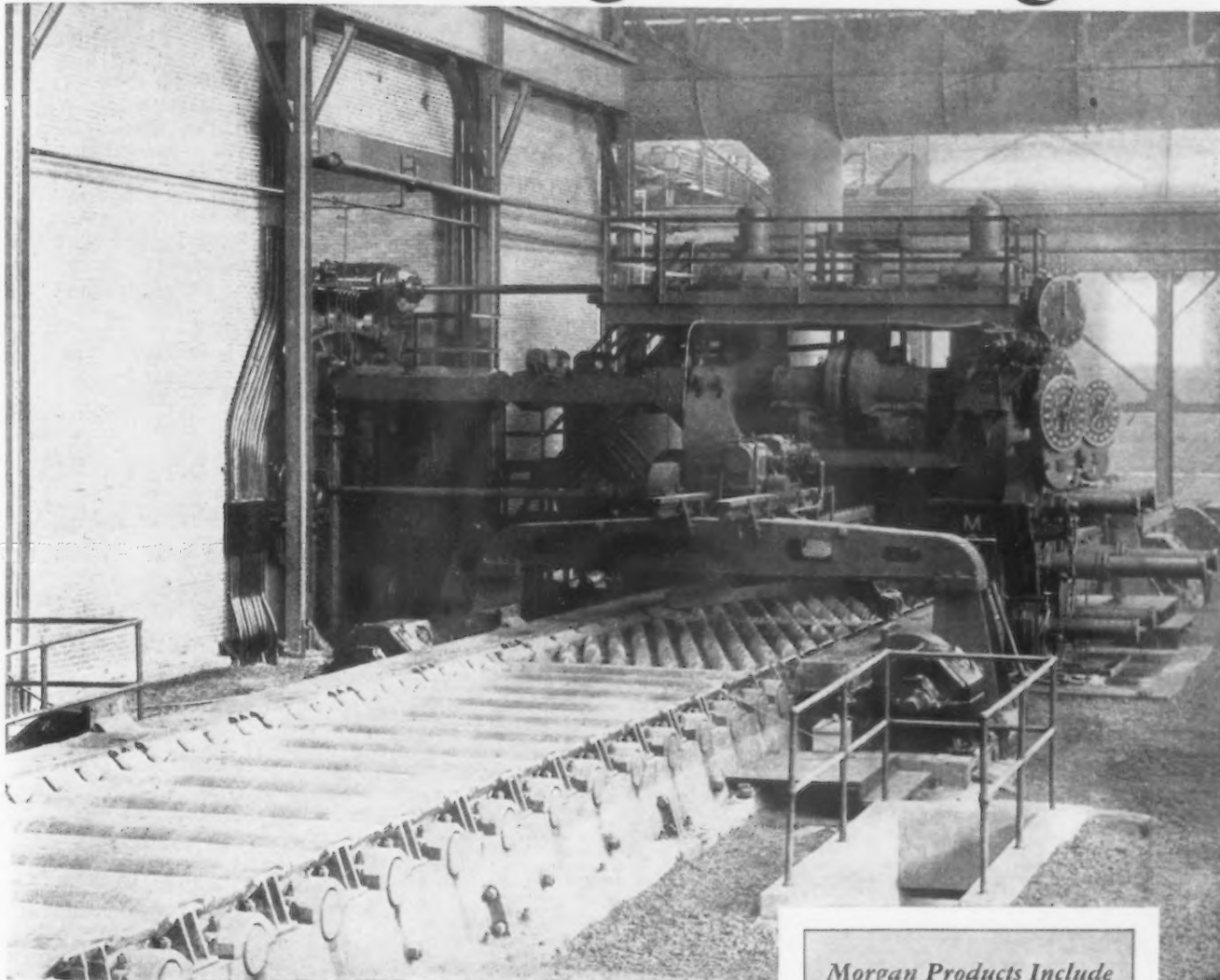
Montague Rod & Reel Co., Montague City, Mass., affiliated with B. F. Gladding & Co., South Otselic, N. Y., manufacturer of fishing rods and tackle, has acquired plant and business of G. H. Mansfield Co., Canton, Mass., manufacturer of kindred equipment, and will consolidate.

Danielson Mfg. Co., Danielson, Conn., has been organized by E. M. Day, Hartford, Conn., and Cyril Coleman, West Hartford, Conn., capital \$50,000, to manufacture loom pickers and other textile mill equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 22 for refrigerating plant for Portsmouth, N. H., Navy Yard (Schedule 9049).

Northampton Electric Lighting Co., Northampton, Mass., is arranging for consolidation with Mill River Electric Co., operating at Goshen and Williamsburg, Mass., under first noted name. Consolidated company plans improvements, including transmission lines for interchange of service between two utilities.

BUILT BY **MORGAN** *Engineering* » »



ADEQUATE experience accumulated over 63 years in serving many other well-known steel mills enabled Morgan engineers to design and build this 46" 2-High Universal Plate Mill used to roll wrought iron plate in the A. M. Byers Company plant at Ambridge, Pa. Morgan engineers have at their command a plant provided with the most modern equipment and a highly skilled shop organization, capable of executing successfully the most progressive ideas in the building of modern steel mill equipment. No project is too big for Morgan.

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STEAM HAMMERS
STEAM HYDRAULIC FORGING
PRESSES
SPECIAL MACHINERY FOR
STEEL MILLS

•
DESIGNERS
MANUFACTURERS
CONTRACTORS

Colonial Beacon Oil Co., 30 Beacham Street, Everett, Mass., plans bulk oil storage and distributing plant at Framingham, Mass. Cost about \$27,000 with equipment.

Indian Motorcycle Co., Springfield, Mass., is expanding line of production and has arranged for commercial output of new scout pony express, a lightweight delivery van with motorcycle. Company has just received Government contract for 75 motorcycles and sidecars for army service.

Crown Hardware Mfg. Co., New Haven, Conn., has been organized by A. McC. Mathewson, New Haven, and G. C. Kiefer, Hamden, Conn., to manufacture hardware and kindred metal goods.

Lee Electric Co., Lee, Mass., is arranging for a merger with Pittsfield Electric Co., Pittsfield, Mass., and will carry out improvements, including power line construction.

Ball & Roller Bearing Co., Danbury, Conn., has been taken over by Howard I. Beard and others.

Davis Brothers, Barre, Vt., are considering new granite cutting plant to replace one recently destroyed by fire. Crane equipment will be required.

Bangor & Aroostook Railroad Co., Bangor, Me., contemplates building a coal pocket at Houlton, Me., for which coal handling equipment will be purchased.

◀ SOUTHWEST ▶

City Council, Hominy, Okla., is considering proposition made by Trans-American Construction Co., Philtower Building, Tulsa, Okla., for erection of municipal electric light and power plant at \$134,800. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Purchasing Department, Department of Interior, Washington, asks bids until Dec. 8 for steam powerplant and underground distribution system for central steam-heating service at Sequoyah Training School, Tahlequah, Okla.

Rock Port Minerals, Inc., Malvern, Ark., H. R. McKnight, president and general manager, has plans for new ore mining plant and concentrating mill near city for production of rutile and other mineral products. Company plans early purchase of grinding, concentrating and other machinery. Cost over \$40,000.

Boal Foundry & Machine Co., Fort Smith, Ark., is planning to rebuild part of plant recently destroyed by fire.

Chicago, Rock Island & Pacific Railroad Co., Chicago, is advancing operations at locomotive and car repair shops at Shawnee, Okla., re-instating about 250 men.

Hussman-Ligonier Co., 911 North Broadway, St. Louis, manufacturer of commercial refrigerators, butchers' equipment and supplies, etc., operated by Allied Store Utilities Co., same address, has taken over four-story building, totaling about 100,000 sq. ft. floor space, and will remodel plant unit.

O. K. Portland Cement Co., Ada, Okla., has adopted three 8-hr. day shifts at local mill, giving employment to increased working quota.

Leeds Cash Register Mfg. Co., Kansas City, Mo., has been organized by H. D. Rayne, Commerce Building, and associates to manufacture cash registers and parts.

Board of Education, Hannibal, Mo., plans manual training department in new two and three-story and basement high school, for which general contract has just been let to Busboom & Rauh, 916 Walnut Street, Kansas City, Mo. Cost about \$275,000 with equipment. Felt, Dunham & Kriehn, 300 West Forty-seventh Street, Kansas City, Mo., are architects.

State Highway Department, Austin, Tex., asks bids on general contract until Nov. 28 for one-story equipment storage, distributing and repair buildings at El Paso, Abilene, Paris and Pharr, Tex. Department has authorized appropriations of \$28,396 for purchase of new highway and road equipment, and \$10,000 for equipment for testing laboratory.

Independent Oil Co., Troup, Tex., has purchased 10-acre tract near Big Sandy, Tex., as site for new refinery. Cost about \$75,000 with machinery.

McNutt Oil & Refining Co., El Paso, Tex., is considering erection of new refinery. Cost close to \$100,000 with equipment, including storage tanks and distributing facilities.

Commercial Pulp & Paper Co., Orange, Tex., has arranged financing in amount of \$500,000, part of fund to be used for reconstruction, extensions and improvements in former mill of

Yellow Pine Paper Mill Co., acquired several months ago, including installation of additional equipment. Two additions will be built.

◀ CANADA ▶

Wright-Hargreaves Mines, Ltd., Kirkland Lake, Ont., has plans for a mill addition early next year to bring capacity from 800 to 1200 tons a day.

Columario Gold Mines, Usk, B. C., plans erection of a mill in near future.

Beattie Gold Mines, head office, Concourse Building, Toronto, care of Ventures, Ltd., has plans for a mill unit in northwestern Quebec.

Ventures, Ltd., Concourse Building, Toronto, will erect a mill at its property at Island Lake, Man., and plans to have it in operation early next summer.

◀ PACIFIC COAST ▶

Texas Corp., 929 South Broadway, Los Angeles, has plans for new bulk oil storage and distributing plant at Miami, Ariz., to replace unit destroyed by fire several weeks ago. Cost about \$35,000 with tanks and other equipment. Headquarters are at 135 East Forty-second Street, New York.

Signal Section, Signal Corps, Presidio of San Francisco, asks bids until Nov. 21 for twist drills, screw anchors, sleeves, screws, washers, cable grips and other mechanical supplies (Circular 11).

Verde Irrigation and Power District, Security Building, Phoenix, Ariz., W. H. Bartlett, secretary, plans erection of four main power plants, pumping stations, power substations and power transmission lines in connection with irrigation project on Verde River. Application has been made for financing in amount of \$16,000,000 for project, of which about \$7,774,000 will be expended for machinery and equipment.

KPO Broadcasting Station, Fifth and Market Streets, San Francisco, has authorized new broadcasting station on site in San Mateo County, with ten times increase in present power, including steel towers, power station and other units. Cost about \$225,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for one motor-driven engine lathe (Schedule 9063); until Dec. 6, one box type electric furnace (Schedule 9105) for Mountain View, Cal.; Naval Station; until Nov. 29, 39,000 ft. close-link coil chain (Schedule 9067); until Dec. 6, quantity of three-conductor copper cable (Schedule 9113); 12 outdoor type distribution transformers (Schedule 9111) for Mare Island Navy Yard; until Nov. 29, one motor-driven cylindrical plain grinder (Schedule 9103) for Puget Sound Navy Yard, 10,500 attachment plugs (Schedule 9073) for San Diego and Puget Sound navy yards.

Fisher Flouring Mills, Seattle, plans expansion and modernization program at mills on Harbor Island. Cost about \$100,000 with equipment. Headquarters are at 1386 East Seventh Street, Los Angeles.

Murray Steel Products, Inc., Los Angeles, has been organized by Richard M. Goldwater, Los Angeles; S. Earl Wright, Long Beach, Cal.; and Loyd Wright, 1120 Board of Trade Building, Los Angeles, to manufacture steel products.

Associated Oil Co., 79 New Montgomery Street, San Francisco, plans extensions and improvements in bulk oil storage and distributing plant at Vacaville, Cal., including installation of pumping machinery and other equipment.

Superintendent of Lighthouses, Ketchikan, Alaska, asks bids until Dec. 13 for erection of one-story iron buoy building, and installation of crane runway and hand-operated traveling crane.

◀ FOREIGN ▶

Municipal Council, Barcelona, Spain, plans large international airport, with hangars, repair and reconditioning shops, oil storage and distributing plant and other field units; also mooring and hangar facilities for seaplanes and dirigibles. Cost over \$250,000 with equipment.

Ministry of Interior, Cairo, Egypt, asks bids until Dec. 10 for equipment for Bouch power plant, including two Diesel engine units with accessories, two electric alternators, pumping machinery, switchgear, air compressor, traveling crane and other machinery.

Minister of Public Works, Buenos Aires, Argentine Republic, is planning development and improvement program at Port of Rosario, including erection of two export storage and distributing buildings, wharves, extension in port railway system and facilities and other port structures, with cranes, conveyors, loaders and other mechanical-handling equipment. Cost about 20,000,000 pesos (approximately \$11,600,000) with equipment.

State Government of Guanajuato, Guanajuato, Mexico, is planning irrigation system, impounding waters of three rivers by construction of dam at San Luis de la Paz. Project will include power plant, pumping stations and other structures. Cost about 4,000,000 pesos (approximately \$1,300,000) with machinery.

British Iron and Steel Output Higher

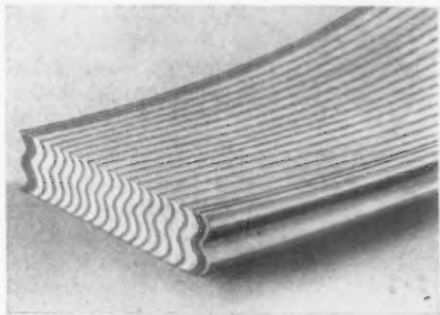
LONDON, ENGLAND, Nov. 12 (By Cable).—Production of both pig iron and steel in the United Kingdom gained in October over that of September. Steel ingot output last month was 438,500 tons against 430,300 tons in September, while pig iron production rose to 275,600 tons from 260,400 tons in September. Monthly totals for all of 1931 and for 10 months of this year follow:

	Pig Iron	Steel Ingots
1931		
Jan.	337,200	402,200
Feb.	318,200	486,400
March	357,100	500,100
April	323,200	397,400
May	346,500	435,100
June	323,800	428,900
July	317,000	428,700
Aug.	275,700	375,300
Sept.	248,200	400,500
Oct.	284,200	457,400
Nov.	296,400	459,200
Dec.	330,600	422,400
	3,758,100	5,193,600
1932		
Jan.	332,400	429,700
Feb.	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500

Trackwork Shipments Lower in October

The American Iron and Steel Institute reports that October shipments of T-rail trackwork amounted only to 1245 net tons, against 1430 tons in September. The high total for the year was 3340 tons in April. The nine months' total is 23,668 tons, which indicates that 1932 as a whole will show considerably less than half of the 60,901 tons shipped in 1931.

Purdue University will hold its eighth annual conference on welding on Dec. 8 and 9, under the direction of the Engineering Extension Department and the Department of Practical Mechanics. Manufacturers of welding equipment will cooperate. The two-day educational meeting will consist of exhibits, demonstrations and talks of interest to users of electric or gas welding in manufacturing, maintenance and repair operations. Anyone interested in welding is invited. There is no registration fee.



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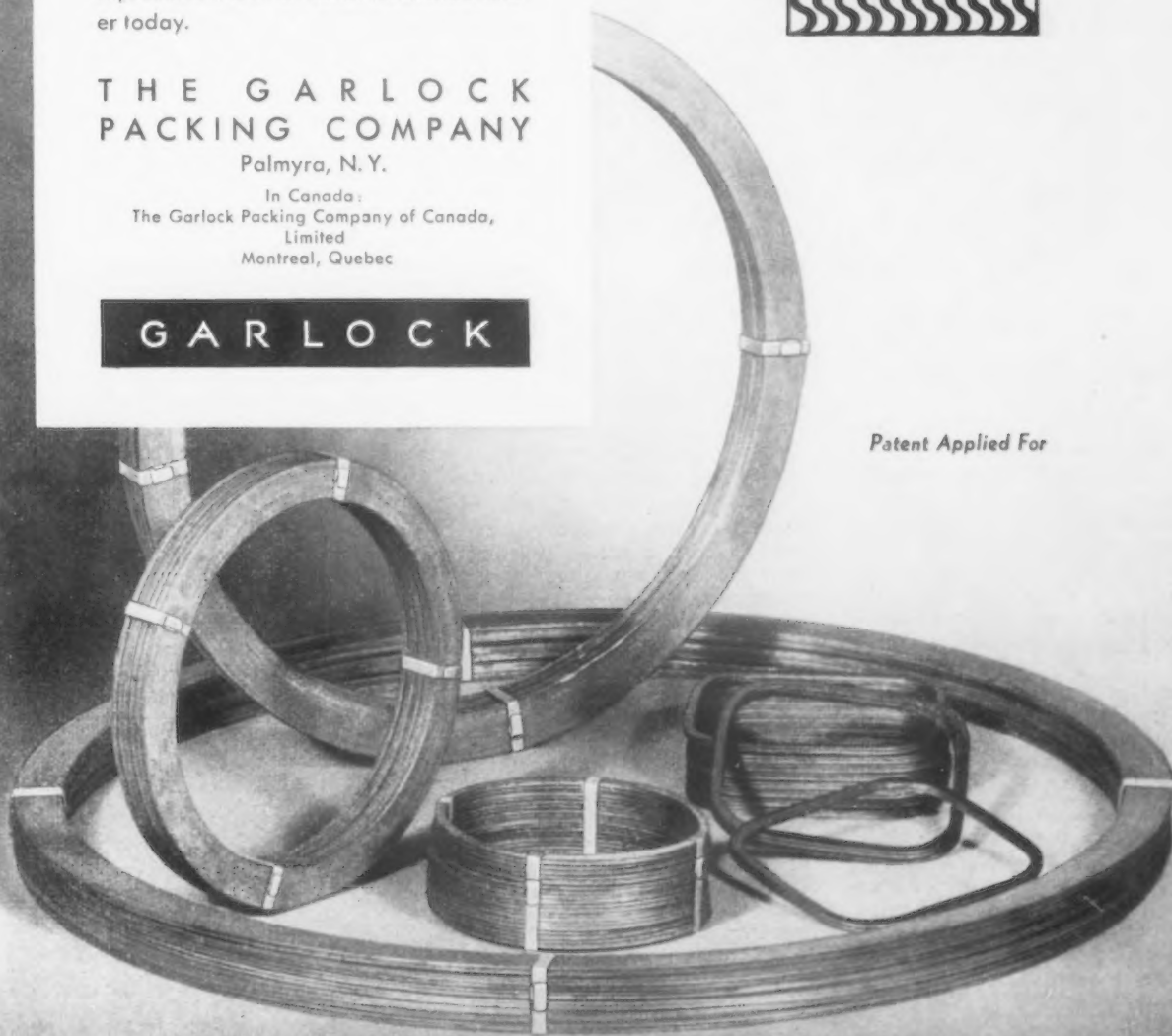
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Motor Car Makers Expand Operations; Plymouth Boosts Its Schedule

(Concluded from Page 773)

way on Willys-Overland engines. Graham-Paige has placed orders for more than \$1,500,000 worth of materials, including steel, for delivery during December and January. It will make only minor changes in its cars for next year.

Ford's production at Dearborn is little more than 1000 cars a day, three days a week. Its purchases of steel have been of negligible proportions and are likely to be meager the remainder of the year. A few Ford suppliers received unexpected releases last week which temporarily boosted their operations somewhat. A spokesman for the Ford company has denied that any of its assembly plants are to be abandoned, stating that some are being closed to effect manufacturing economies, but will be reopened as soon as their productive capacities can be profitably employed.

Detroit Notes

General Motors produced only 5810 cars in October, but sold at retail 26,941 cars. Its sales to consumers since March 1 have exceeded assemblies by 74,059 units. Chevrolet's field stocks today average only three cars to a dealer. . . . Engines for the Canadian Pontiac car will be manufactured and assembled hereafter at the General Motors plant at Walkerville.

Says Alloy Steel Scrap Problem Must Be Solved

Good pig iron can be produced by a liberal use of carefully selected alloy steel scrap, declared Karl Steinbacher, superintendent of blast furnaces, Wheeling Steel Corp., in a recent talk before the Cincinnati chapter of the Institute of Scrap Iron and Steel. Practically any kind of scrap can be used, up to 10 per cent, in the blast furnace, without additional fuel, he stated.

He explained that scrap is one of the greatest cost reducers in the operation of blast furnaces, and pointed out the problems which the scrap iron dealers and the blast furnace operators will face in the near future because of the great production of alloy steel scrap. He described the ill effects of stringy turnings on the blast furnace, and discussed various other commodities that the scrap dealers sell. In his opinion, the future scrap dealer would have to surround himself with a higher class of labor and a metallurgist.

"Your business is responsible for the blast furnace taking a back seat for

This will materially increase the Canadian content in Pontiac cars. Chevrolet's Canadian engines have been made for some time at Walkerville. . . . One of the medium-price cars next year will have a floor for its bodies made out of one piece of wide sheet steel. . . . Even the reverse and reverse idler gears on the new Dodge are cut with new-formula helical teeth. Speed changing is done through finger-tip pressure, by a single, silent gear selector collar moving on the transmission main shaft. Steering is made easy by the use of needle roller bearings with slender steel rollers often no thicker than an ordinary pencil lead. Although the price has not been announced, the four-door sedan will sell at less than \$700 at the factory.

W. R. Angell, president, Continental Motors Corp., Detroit, has announced a change in the name of its automobile division from the Continental-DeVaux Co. to the Continental Automobile Co. The new company will build and market the new line of motor cars which will carry the Continental name. In addition to Mr. Angell, the officers are Roger Sherman, vice-president; F. F. Beall, director; F. L. Rockelman, vice-president in charge of sales; Wallace Zwiener, treasurer, and W. C. Keith, secretary.

the time being," said Mr. Steinbacher. "The country is rapidly becoming alloy minded as well as scrap minded. There is frequently a conflict between the blast furnace and open-hearth man. When the open-hearth man has difficulty with his melt, he frequently blames the pig iron, because of the scrap used in the blast furnace. This sometimes is unjustified because the open-hearth furnace and the blast furnace frequently use the same scrap, the difference being that the open-hearth uses 60 per cent scrap and the blast furnace uses only 10 per cent, or less. For steel-making, iron scrap should be classified according to analyses and used accordingly.

"The scrap for the blast furnace is one of the greatest cost reducers we have. Scrap can be used up to 10 per cent in the blast furnace, without additional fuel. The merchant pig iron producer hasn't tumbled to the fact that he can produce better pig iron by a liberal use of carefully selected alloy steel scrap. Practically any scrap can be used in the blast furnace if it is prepared and selected right.

"If I were in the scrap business, I'd charge more for new scrap, new turnings, and less for rusty scrap, because old and rusty scrap upsets op-

erations if used as scrap only. Rusty scrap requires some extra fuel because reduction becomes a factor. The Institute of Scrap Iron and Steel is going to have thrown into its lap the problem of alloy scrap. The proper solution to this problem is too big a task for the individual, and must be done by an organization, with the cooperation of the mills. I see a picture of the future scrap dealer, surrounding himself with a higher class of labor and a metallurgist. An organization of this kind has an intrinsic value, but I doubt whether you realize it, a potential power in the iron and steel trade, a power that carries with it a very heavy burden and responsibility and this responsibility is real and not a fancy."

New Type Railroad Car Uses Rustless Steel

Rustless steel figures prominently in the construction of a pneumatic-tired, Diesel-powered, 47-passenger railroad coach, the first of its type to be built for an American railroad, which was delivered recently to the Reading Co. by the Edward G. Budd Mfg. Co., Philadelphia. Great economy of weight resulted through the use of rustless steel, which is "shotwelded" into sections adapted to resist the loads imposed. The material used in this car is cold-worked to a tensile strength of 150,000 lb. per sq. in. An example of the weight economy obtained by the use of this material is the floor beam, which, though capable of carrying the entire passenger load uniformly distributed, weighs only 12 lb. The body of the car weighs about 9000 lb., including about 3700 lb. of rustless steel which is welded into a compact unit. The total weight of the car, which has a maximum speed of from 50 to 55 miles an hour, is only 22,000 lb.

In accepting delivery of the car from Edward G. Budd, president of the Budd company, Charles H. Ewing, president of the Reading Co., stated that, in view of its low cost, light weight, comfort and operating economy, the car probably will effect radical changes in railroad passenger transportation and will aid in rehabilitating many suburban and branch lines which are running at great loss or which have been abandoned.

Orders for business furniture in September totaled \$550,672 against \$573,868 in August, according to reports received by the Bureau of the Census from 36 manufacturers. September orders for steel shelving furniture were valued at \$156,648 against \$125,304 in the preceding month, according to reports from 16 manufacturers.

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